Based on 44 sources

Module Name	Technical Domain	Description	Standards/Regulatory Compliance	Operational Framework Component	Data Metric/Value	Credential Mapping (Inferred)	Source
GENIAC	Military Combat Engineering / AI / Infrastructure Automation	A multi-disciplinary module and flagship initiative (Operation GENIAC) focusing on military-grade logic, research, and technical trade skills. Includes the State Asset Information Management System (SAIMS) for digitizing and automating public infrastructure assets, tactical engineering systems (bridge building, watermanship), and generative intelligence for transformer science and human-machine	SAQA, NQF, MIL-STD, ECSA, POPIA, IFMS, B-BBEE, PSIRA, SABS, DHET, SANDF, SAPS, IEC	Infrastructure Overhaul, Defense Planning, and Cybersecurity (ZTNA, NAC)	Budget: R40,000,000 to R50,000,000,000; R600M investment; R1B revenue target; 75MHz clock speed; 64KB memory; Combat Mass: 30F	NQF Level 6–9 (National Diploma to Master's Degree level); Professional Recognition in Utility Management	[1-8]

		collaboration.					
S.E.E.E.I.S.U.A (Framework)	Urban Energy Governance / Infrastructure Policy	Social Education and Industrial Trade Vocational career module and holistic framework (Strategic, Economic, Environmental, Engineering, Institutional, Social, Utility, Asset). Focused on rural/urban electrification, grid overhaul, intergovernmental energy regulation (South Union Africa), and circular assessment for engineering subjects.	SAQA, NQF, SABS, SANS, ISO 37301, SGB, QCTO, ECB, PSIRA, DHET, NFPA 70-2014, NDP 2030, ERRP, Public Procurement Act (2024)	Grid Infrastructure, Energy Management, and Policy Scaffolding	0.3 to 0.4 kWh/day limit; 13.8kV Primary/4.16kV Secondary; 3750KVA; 3600 kWh annual index; R350B/year public investment target; 87% machine availability	NQF Level 6–10 (National N Diploma to Doctorate in Infrastructure Management); Professional Engineer/Technologist	[1-8]
Madinda Utilities AMI Rollout	Advanced Metering Infrastructure / Electrica	National rollout of DLMS/COSEM-compliant hardware for urban	IEC 62056-5-3, DLMS/COSEM, AFSEC, SABS, NRS 049-2:2024	Industrial Localisation and AMI Manufacturing	0.3-0.4 kWh daily production (SHS); >$ 126M COP24 grant;	Technical leadership in smart grid manufacturing (NQF Level 6)	[7, 9]

	l Engineering	revenue protection, featuring localized manufacturing (two production plants and 13 satellite warehouses).			2,700 direct jobs		
Advanced Electrical Engineering Curriculum	Education Technology / Power Systems	Structured technical training encompassing Advanced Electromagnetic Theory, DSP, Control Systems Design, and Renewable Energy Systems.	NRF, SARAO, ECSA, SAQA ID 90674, QCTO	Curriculum Assessment and Audit-Ready Learning Pathways	360 Credits (NQF Level 6); ICASS Test Weightings: 30% (Test 1), 70% (Test 2)	Academic mapping to National N Diploma and Professional Engineering registration	[7, 10]
PSIRA Compliance and Security Policing	Security Policies and Law Enforcement	Regulation and control of the security occupation in the public/national interest, including the installation of electronic security systems.	PSIRA Act 56 of 2001, SASSETA, LRA	Security Management and Intelligence Infrastructure	30 to 90 days standard investigation period	Professional Security Certification (Grade A, B, C)	[1]
National Trade Portfolio Evaluatio	Security and Education	Comprehensive assessment of trade	QCTO, SAQA, NQF	Work-Based Learning (WBL) / Portfolio of Evidence	2,670 hours (24 months) relevant	NQF Level 6 / Professional Artisan Status	[11]

n	Policy	portfolios including site inspections at utilities (City Power/Eskom) for work readiness.			work experience required		
Embedded Systems and Digital Logic	Educational Technology / Computer Engineering	Introduction to digital system fundamentals, Boolean algebra, logic gates, and algorithmic state machines for microcontrollers.	NQF Level 6, IEEE Standards	Software and Hardware Integration Framework	120 credits minimum	Bachelor of Science in Engineering (NQF Level 7/8)	[1]
Information Management Systems	Education Technology / Security Policy	Systems for tracking student progress, career alignment, and security policy integration using data science.	SAQA, LRA, CCMA, POPI Act	Log Activity and Information Management System	100 MB storage limit; 360 credit points	ICT Support Specialist / Data Scientist (NQF Level 5-7)	[5]
NATED / NCV Integration	Vocational Education Curriculum	Framework combining academic-based (NATED) and practical-based (NCV) systems for holistic engineering	NQF, DHET, QCTO	Blended Learning (Online/Classroom/Workplace)	ICASS Weighting: Test 1 (30%), Test 2 (70%)	National N Diploma (NQF Level 6)	[12, 13]

		education.					
Smart Power Metering Module	Urban Energy Management	Three-phase smart power measurement system utilizing GPRS for remote communication and billing data processing.	IEC 62056, IEC 61850	Data Inventory Management	240 VAC +20%; 0-60A range; 10 kWh energy limit	Electrical Systems Technician (NQF Level 6)	[4]
Industrial Electronics (N5)	Power Control and Signal Processing	Advanced electronic principles including AC theory, power supplies, amplifiers, and transducers.	SANS 10142-1, OHS Act	Technical Calculations and Derivation	80% pass mark; VDC ≈309.6V	Electronic Engineer / Systems Optimizer (NQF Level 6)	[5]
Modicon PLC Configuration	Industrial Automation and Control	Programming and integration of programmable logic controllers for process machine control and variable speed drives.	IEC 17025, SANS Class 0,2	Technological Integration / Digital Transformation	30kA SCCR; 230V AC Coil; 1200 note/Min	Technical Expert / Automation Specialist	[6]
DL SGWD-AI / FACTORY-AI	Smart Grid & Factory Automation	Advanced didactic laboratories and manufacturing simulations combining AI-driven	ISO 9000, IEEE, MODBUS RTU, RS485	Infrastructure Overhaul / Curriculum Strategy	Class 0.2 Accuracy; OEE: 50%	Smart Grid / Industrial Automation Engineer (NQF Level 6)	[2]

		analytics, IoT devices, and electrical networks.					
GENIE (SECURITY / POLICE)	Cyber Resilience / Regulatory Enforcement	Embedded protocols for infrastructure protection, biometrics, and municipal/industrial energy compliance auditing.	PSIRA Grade A–E, MIL-STD, DHET, OHS Act	Intrusion Detection and Industrial Zone Regulation	Security Posture: SAST/DAST metrics; 80% vending compliance	Security Management Professional / Compliance Officer	[8]
Electrical Trade Theory N1-N2	Military Combat and Electrical Engineering	Foundational training in DC theory, wiring standards, and magnetism applied to industrial and security infrastructure.	SANS 10142-1:2024, MIL-STD, IEC	Curriculum Structure / Blended Learning	Pass Mark: 40%; Duration: 3 hours; 30% DC Theory weighting	NQF Level 2 / Trade Test Eligibility	[11]
TeSys™ T LTMR	Motor Management and Control	Motor management controller providing monitoring, protection, and control functions.	IEC 61508, SIL 2, IEC 60364	Logic Solver with Passive Input	4-20mA loop current (3.6mA low to 21mA high)	Technical Systems Operator/Maintenance Engineer	[3]
Matrix-UPS	Power Protection and Distribution	Line interactive uninterruptible power supply for	UL 1778, CSA C22.2, EN 60 950, FCC Part 15	Power fault detection and isolation filter	Efficiency: 93% at 100% load; Overload:	Data Center Infrastructure Specialist	[3]

		protected computer loads.			10 sec at 200%		
Transformer Systems Analysis	Electrical Infrastructure	Calculations and design for substation transformers and medium-voltage distribution networks.	SANS 10142, IEC 60364	Data Inventory	3200 kVA Peak Capacity	Power Systems Technician	[2]
MetBook Operations	Security Sector Policy	Electronic duty book automation and licensing administration for policing and private security sectors.	PSIRA, SASSETA, SAPS	Infrastructure Overhaul	9000V Fence Threshold	Security Licensing Administrator	[2]
Collision Scenario Engine	Simulation / Industrial Safety	Models impact, response, and investigation protocols for infrastructure safety and tactical readiness.	MIL-STD-882	Diagnostic modeling and scenario investigation	Impact diagnostic simulation; RRT algorithms	Safety Engineer / Systems Analyst	[8]
Automated Teller Machine System	Security & Financial Technology	Secure transaction processing system with PIN encryption and database integration for	PSIRA, ISO/IEC 27001	Security Policy Implementation	6.5 Service Charge; 150 Balance; PIN 9343	Security Software Developer (NQF Level 7)	[4]

		auditing.					
Microgrid Optimization Module	Urban Energy Governance	AI-driven optimization for hybrid renewable microgrids and smart grid energy storage technologies.	SABS, Dept of Energy (RSA)	Infrastructure Overhaul / Rural Electrification	0.3 to 0.4 kWh per day SHS; Budget: $4,000,000	Master of Engineering (MSEE)	[6]
Energy: Domestic Systems	Renewable Energy / Electrical Engineering	Mandatory units covering wind turbine systems and solar hot water systems for domestic use.	National Occupational Standards (NOS), SCQF	Curriculum Assessment Strategies	24 SCQF credits; ±3mm tolerance level	Engineering Technician / Renewable Energy Installer	[5]
Drawing Analyse Design System	Engineering & Education Technology	Transdisciplinary framework for technical system analysis through schematic interpretation and fault diagnostics.	SAQA, NQF, ISO 1999	Curriculum Assessment Strategy	12.88 MB File Size; 32.768kHz Crystal Frequency	Trade Theory Certification (NQF Level 4/5)	[4]
Electrical Diploma Validator	Education Technology / Credentialing	Visual Basic automation suite used for validating N4–N6 credentials and diploma authenticity	SAQA, DHET, QCTO	Credential Dashboard with NQF Tracking	Automation logic for 360 credits validation	Academic Registrar / Assessment Moderator	[8]

Schneider Home Certification	Home Energy Management	. Training for installing and commissioning home energy management systems including inverters.	NABCEP	Commissioning with eSetup App / Smart Panel App	80% passing score required	Professional Installer Certification	[3]
Traction Substations (Type 1 & 2)	Railway and Urban Transportation	Facilities responsible for supplying trains with electrical energy.	Not in source	Operational Management (Monitoring and Control)	Manage ~75% of railway electricity; 25kV AC / 600V-3.3kV DC	Electrical Infrastructure Project Manager	[3]

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Date	Institution / Platform	Item / Module	Sale Price	Amendment	Final Cost	Award / Certificate	Status	Notes / Integration Points	Source
202	Atlantic	MBM302	$450.0	Researc	$300.	Master of	Accept	Portfolio	[1]

5-10-08	International University	Master Thesis Review	0	h Grant Applied (-$150.00)	00	Engineering Systems – Thesis Accepted	ed	artifact submitted to LMS and AIU Library	
2025-10-08	NRF / AIU	MATLAB Research License	R12,000.00	NRF Grant Applied (-R8,000.00)	R4,000.00	IJETR3156 – Paper Accepted	Accepted	SCQF/NQF Level: 8. Portfolio artifact submitted to NRF dashboard and AIU Library	[1]
2025-10-08	NSF / F1000Research	Open Access Publication Fee	$1,200.00	NSF Grant Applied (-$800.00)	$400.00	F1000Research Poster Accepted – Helicases and Translocases	Accepted	Publication indexed in PubMed Central and linked to AIU thesis	[1]
2023-Present	Atlantic International University (AIU)	Doctorate in Engineering (Specialist Infrastructure)	$35.00	Not in source	Not in source	Doctorate in Engineering (In Progress)	Pending	Focus on infrastructure, sustainability, and credential reform	[2]
2025-10-08	ECSA / CCMA / Home Affairs	Professional Engineering Registration	R1,500.00	Academic Grant Applied (-R500.00)	R1,000.00	Certificate – Registered Professional Engineer	Record submitted	Record submitted to CCMA dispute resolution log and Master Court archive	[1]
Not in source	SAQA / NATED	National N Diploma in Electrical Engineering	Not in source	Not in source	Not in source	National N-Diploma (N4–N6)	Audit Readiness	SCQF/NQF Level 6; ID: 90674; Includes WA code competency mapping for ECSA registration	[2]

2012-07-01	Cape Peninsula University of Technology / SAQA	Doctor of Technology: Engineering: Electrical (ID 78780)	Not in source	Replaced by ID 97019	Not in source	Doctoral Degree	Passed End Date (2014-12-31)	SCQF/NQF Level 10; 240 Credits; HEQSF sub-framework	[3]
2025-10-08	Schneider Electric / Eaton	EcoStruxure Smart Panel	R12,000.00	Club Clipsal Loyalty Credit (-R2,000.00)	R10,000.00	Certificate – Energy Management Compliance	Record submitted	Record submitted to GitLab audit log and Azure DevOps billing portal	[1]
2025-10-08	Eaton Power Advantage	9PX UPS System Sale	R18,000.00	Partner Discount (-R3,000.00)	R15,000.00	Certificate – Power Management Fundamentals	Record submitted	Record submitted to LMS and GitHub audit log	[1]
2025-10-08	City Power Johannesburg	Smart Meter Installation – Industrial Zone 3	R3,200.00	Eskom Loadshedding Adjustment (-R830.00)	R2,370.00	Certificate – Energy Efficiency Compliance	Audit readiness	Record submitted to municipal audit portal and SCQF/NQF compliance dashboard	[1]
15 Oct 2025	National Science Foundation (NSF)	NSF Pitch #00110596	$1,000.00	-$250.00	$750.00	Pending Review	Audit Ready	Linked to GitHub/GitLab audit sheet; Power Management focus	[4]
2025-09-01	Ministry of Higher Education and Research (France)	BTS Electrotechnics (Electrotechnique)	Not in source	Not in source	Not in source	Brevet de Technicien Supérieur (BTS)	Registration start date	EQF Level 5; NSF Codes 227, 250, 255; RNCP41007; Smart electrical installations	[3]
202	Govern	Decree	Not in	Modifie	Not in	Official Decree	Legally	Articles	[3]

0-03-17	ment of France (Journal Officiel)	defining BTS Electrotechnique delivery conditions	source	d 2023-01-05	source		active	D643-1 to D643-35-1; OQSF compliance	
2025-10-08	GitHub	Reward Model Deployment – PRM	$120.00	Open Source Credit (-$40.00)	$80.00	Contributor Badge – RewardHub	Record submitted	Record submitted to GitHub audit log and Archive.org metadata index	[1]
2024-11-20	Schneider Electric	Masterpact MTZ Substitution & Technical Guide	Not in source	Not in source	Not in source	Technical Guide	Audit trace enabled	Size: 20.7 MB. Used for mapping legacy-to-modern product equivalence and trade test validation	[5]
2021	Schneider Electric	Industrial Automation & Sustainability	Not in source	Not in source	Not in source	LMS-integrated module	Completed	Integrated with LMS platforms for sustainability training	[2]
21 May 2025	Digital Factory / Schneider Electric	Altivar Machine Professional Certification (Version 23.0)	Not in source	Not in source	Not in source	Altivar Machine Professional	In Progress	30+ hours curriculum; includes ATV320/340 and ATS480 functions	[4]
Not in source	Schneider Electric University	Professional Energy Manager (PEM)	Not in source	Not in source	Not in source	Professional Energy Manager	In Progress	68h 15min curriculum; 91 modules including HVAC and Energy Audits	[4]

14 Jan 2024	Industrial Automation Academy / Schneider Electric	Easy Lexium 16 Servo Drives & BCH Servo Motors	Not in source	Not in source	Not in source	Not in source	In Progress	eLearning module; covers motion and HMI	[4]
2024-2025	SQA	Electrical Engineering Principles (J6CW 47)	Not in source	Not in source	Not in source	SCQF Level 7	Pilot (NextGen HN v4.0)	24 Credit Points. Outcomes include DC Principles and Three-Phase Principles	[6]
2023-05-16	SQA	AH Engineering Science 2023 (X823/77/11)	Not in source	Not in source	Not in source	Advanced Higher	Audit-ready	Topics: Project Planning, Amplifier Design, Solar Heating. Worksheet required	[6]
2025-05-16	SQA	AH Engineering Science 2025 (Paper X823/77/11)	Not in source	Not in source	Not in source	Advanced Higher	Audit readiness	75 marks total. Includes modules on Project Management and Structural Analysis	[6]
2024	SQA / DHET	Engineering Trade Theory (N1-N2)	Not in source	Not in source	Not in source	Trimester Evaluation	Completed	Mapped to SANS 10142-1 standards; 100 hours total work schedule	[2]
2019-12-	SAQA (South African	National Certificate:	Not in source	Replaced ID 48475	Not in source	National Certificate	Passed End Date	SCQF/NQF Level 03; 133 Credits;	[3]

05	Qualifications Authority)	Electrical Engineering (ID 72051)					(2023-06-30)	Mining Specialization (ID 72071)	
2025-10-08	Alison Learning	Diploma in Electrical Engineering	$124.46	October Sale Discount (-25%)	$93.35	CPD Accredited Diploma – Electrical Engineering	Record submitted	Record submitted to SCQF/NQF dashboard and GitHub credential repository	[1]
Not in source	ALISON	Professional Certification Journey	Not in source	Not in source	Not in source	Certification Modules	Completed	Digital credentialing for lifelong learning scaffolding	[2]
2025-10-08	Sci-Bono Discovery Centre	Electrical Wiring Kit	R450.00	DHET Grant Applied (-R150.00)	R300.00	Certificate – Basic Electrical Safety	Portfolio artifact submitted	SCQF/NQF Level: 4, WA Code: EA2. Portfolio artifact submitted to LMS	[1]
2020	Sci-Bono / DHET	Facilitator Training & Curriculum Mapping	Not in source	Not in source	Not in source	DHET-accredited certification	Completed	Focus on educator training and curriculum design	[2]
2025-10-08	St Peace College	Engineering Drawing Textbook	R350.00	Academic Grant Applied (-R100.00)	R250.00	Certificate – Fundamentals of Electrical Systems	Submitted for moderation	SCQF/NQF Level: 5. Portfolio artifact submitted for moderation	[1]
2025-10-08	Shoprite / CNA / Elektor	Elektor Electronics Starter Kit	R450.00	Subscriber Discount (-R90.00)	R360.00	Certificate – Electronics Fundamentals	Record submitted	Record submitted to GitHub credential repository and SCQF/NQF	[1]

								dashboard	
2025-10-08	SASSETA / CCMA	Labour Law Training Module	R1,200.00	UIF Credit Applied (-R400.00)	R800.00	Certificate – Workplace Dispute Resolution	Record submitted	Record submitted to MERSETA dashboard and Home Affairs compliance log	[1]
2015-05-18	QCTO	Electrical Engineering N4–N6	Not in source	Not in source	Not in source	NATED Accreditation	Accredited (Exp: 2020-05-18)	Provider: Academy of Training and Development. Accreditation No: NATED/15/0417	[7]
2025-10-08	Metropolitan Police UK	Use of CCTV footage for research	£500.00	Academic Research Waiver (-£200.00)	£300.00	Publication Approved – F1000Research	Approved	IP license granted under non-commercial clause; record submitted to ORCID	[1]
Not in source	JGU / Public Policy Program	MA Public Policy	₹3,00,000.00	Not in source	~$3,400.00	Master of Arts	Audit Readiness	Tracks: Data Analytics / Policy Design. Integration with SQL and dashboard logic	[7, 8]
2024-10-04	GitHub / Microsoft Learn	Accelerate app development by using GitHub Copilot	Not in source	Not in source	Not in source	Module Assessment Passed	Complete (100% Score)	Duration: Various. Part of APL-2007 path. Integration with Visual Studio Code	[5, 7]

2024-11-16	Microsoft Learn	Build custom agents for Microsoft Teams	Not in source	Not in source	Not in source	Learning Path Complete	Complete	Focused on business needs environment. Logged in Training Transcript	[5, 7]
2023	Microsoft	Digital Credentialing & LMS Strategy	Not in source	Not in source	Not in source	Portfolio-ready credential	Completed	Strategic integration for digital portfolio scaffolding	[2]
15 Oct 2025	PRM	Engineering Career Discovery Journey: Experimental, Theoretical, Practical	Not in source	Not in source	Not in source	Transcript Report	Completed	Integrated with SAQA, BICSI, CPD; includes business and digital skills	[4]
2018-08-01	NIMI (National Instructional Media Institute)	Electrician 1st Year (Volume I) Trade Theory - NSQF Level 5	₹285.00	Not in source	₹285.00	Not in source	Published	NSQF Level 5; Electrical Sector; Semester Pattern	[3]
Not in source	Burger Huyser Attorneys	Complete Engineering Patent Filing (South Africa)	R25,000.00	to R30,000.00	R30,000.00	Patent Grant	Service pricing	Legal protection for 20 years; excludes PCT international filing fees	[3]
2025-11-03	Open Source / Community Texts	Design Career 10 Application Trade Drawing Orthopedagogie Material Didactic	Not in source	Not in source	Not in source	Creative Commons BY-NC-SA 4.0	Published	Size: 119.7 MB. Grade 10 career scaffolding. Integrated via UserForm1 90000002	[5]

		Lesson Plan							
2024-10-26	F1000Research	Career drawing total programming: Analysis, Design, Investigation	Not in source	Not in source	Not in source	DOI: 10.7490/f1000research.1120368.1	Published	Version 1; not peer reviewed. Includes PCB implementation and Visual Basic	[5]
18 Nov 2025	IEC Webinar	Advancing Standards for Digital Authenticity	Not in source	Not in source	Not in source	Webinar Insight Log	Scheduled	Focus on deepfakes and provenance tracking; integration with dashboards	[8]
2026-03-15	SQA	Community Garden Volunteering Day (Responsible Business Task)	Not in source	Not in source	Not in source	Work Experience Task	Scheduled	Place: Glasgow Hidden Gardens. Risk assessment via SQAForm	[6]
Not in source	Lucas-Nülle	UniTrain-I: DC Technology Course (SO4204-4D)	Not in source	Not in source	Not in source	Course Certificate	Audit Ready	Multimedia training system; USB Interface; includes 3 test cards	[3]
18 Apr 2024	Underwriters Laboratories (UL)	Electrical Arc Flash Awareness	Not in source	Not in source	Not in source	Not in source	In Progress	Course code: GSCHSES0001004; Basic level safety training	[4]
Not in source	ISC2 / Credly	Certified in Cybersecurity (CC)	Not in source	Not in source	Not in source	Digital Badge	In Progress	Linked to Azure DevOps and GitHub	[4]

								Copilot modules for audit	
Not in source	Salesforce / Trailhead	CRT101 Salesforce Certified Administrator	Not in source	Not in source	Not in source	Salesforce Certified Administrator	In Consideration	Integrated with Agentforce topics and career discovery dashboards	[4]
2017-01-01	Canal-U / Callisto / Urfist	Tutorial on invention patents - Module 8 Introduction	Not in source	Not in source	Not in source	Not in source	Online (2022-05-13)	Covers European patents (EP) vs PCT; Creative Commons CC BY-NC-SA	[3]
2016-10-06	French Ministry of National Education	Circular No. 2016-133: Delivery of certificates for competency blocks	Not in source	Not in source	Not in source	Attestation of competency blocks	Official Bulletin No. 36	Law No. 2014-288; modularization of diplomas; RNCP integration	[3]
14 Jan 2024	Digital Factory / Schneider Electric	Robotics (Test)	Not in source	Not in source	Not in source	Not in source	Failed	Score: 44% (passing 70%); Course code: INDTECT0001000	[4]
14 Jan 2024	Buildings Business 1 / Schneider Electric	Physical Infrastructure Management Basics Quiz	Not in source	Not in source	Not in source	Not in source	Failed	Score: 30% (passing 80%); Course code: BLDSALE1234034	[4]
01 Sep 2025	F1000Research	Career Discovery and Mentoring	Not in source	Not in source	Not in source	Not in source	REJECTED	Document submission; Author: Tshingomb	[9]

		Framework for TVET							e Tshitadi	
17 Apr 2025	F1000Research	Case Report: Master Energy Rural Career Experimental Engineering Electrical	Not in source	Not in source	Not in source	Not in source		REJECTED	Article submission; Author: Tshingombe Tshitadi	[9]

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Section/Topic	Description	Field/Discipline	Qualification/ Award	Institution	Outcome/Requirement	Source
Electrical Engineering (N1–N6)	Comprehensive curriculum covering Electrical Trade Theory, Industrial Electronics, Electrotechnics, Power Machines, and Engineering Science. Includes	Electrical Engineering	National N Diploma / N1–N6 Certificates	St Peace College / DHET / SAQA	Completion of ICASS, ISAT, and external national examinations; NQF Level 6 (360 credits) and 18–24 months practical experience.	[1-11]

	AC/DC machine theory, transformers, and industrial electronics modules.					
Labour Relations & CCMA Rulings	Processing of labour disputes, unfair dismissals, and conciliation/arbitration under the LRA. Handles rescission rulings (Section 144), enforcement of awards (Section 143), and military arbitration.	Labour Relations / Law	CCMA Award / Settlement Agreement / Rescission Ruling	CCMA / Labour Court / ELRC / SANDF	Settlement of jurisdiction referrals, certified awards, or variation orders; issuance of awards within 14 statutory days.	[1-3, 6-8, 11-21]
SAQA Foreign Qualification Evaluation	Policy and criteria for the recognition of foreign school-leaving and higher education qualifications within the South African NQF.	Educational Policy / Regulatory	SAQA Evaluation Certificate / Tracking ID: 2403110060003192	SAQA (South African Qualifications Authority)	Compliance with NQF Act 67 of 2008; recognition limited to documents issued by official national examination bodies.	[1, 2, 7-9, 13-15]
Advanced Electromagnetic Theory	Graduate-level study of Maxwell's equations, field theory, electrostatics, magnetostatics, and wave propagation using analytical and computational methods.	Electrical Engineering	Master's Degree / Doctorate (Specialist)	Atlantic International University (AIU) / University of Buea	100% grade achievement; ability to solve boundary condition problems and simulate electromagnetic fields.	[7, 10, 12, 20, 22, 23]
Madinda Utilities AMI	National rollout of Advanced Metering	Utility Engineering /	Professional Project Implementation	Madinda Utilities / DTIC /	DLMS/COSEM compliance; revenue	[10, 23, 24]

Rollout	Infrastructure (AMI) systems across 186 municipalities, including manufacturing and satellite warehouses.	Infrastructure		SABS / Eskom	protection and reduction of non-technical losses via automated load management.	
Drawing Analysis & Design System	Transdisciplinary framework for analyzing and designing technical systems through schematic interpretation, flow diagrams, and fault diagnostics.	Engineering Drawing / EdTech	WA-coded workplace competencies / Portfolio cornerstone	SAQA / Atlantic International University (AIU)	Integration of drawing logic into LMS modules and assessment rubrics aligned with NQF descriptors.	[3, 13, 16]
AI Fluency & Robotics	Modular programs covering AI basics, Generative AI, Responsible AI, and didactic frameworks for PLC-controlled motor automation.	Artificial Intelligence / Automation	6 AI Certifications / Technical Certification	Sci-Bono ICT Academy / Microsoft / De Lorenzo S.p.A.	Completion of 44 videos (5 hours); development of solutions for anomaly detection and process optimization.	[8, 13, 14, 25]
Vertical Farming & Urban Agriculture	Course exploring the intersection of vertical farming, synthetic biology, and genetic engineering for sustainable food production.	Agricultural Tech / Synthetic Biology	Master's Degree	Atlantic International University (AIU)	Practical skills to design and implement urban farming systems leveraging biosystems.	[3, 13, 16]
Mining Qualifications Authority (MQA)	Skills development in the mining and minerals sector, focusing on	Mining Engineering	Artisan Status (Boilermaker, Diesel Mechanic, etc.)	MQA / DMR	Facilitate accreditation and workplace experience under the Skills	[3, 6, 8, 14]

	artisan development in scarce skills.				Development Act 29.	
Security Services & PSIRA Compliance	Accreditation, operational grading, and syllabus for private security service providers and guard programs.	Security Science	PSIRA Grade A–C / Supervisor	PSIRA / SASSETA	Successful completion of unit standards, SAPS criminal record clearance, and OHS risk assessments.	[2, 4, 13, 14]
Electrical Installation & Standards	Technical specifications for low-voltage installations, voltage drop limits, and circuit breaker ratings.	Electrical Engineering	Certificate of Compliance (CoC)	SABS / SANS / Dept. of Labour	Adherence to SANS 10142-1 (Wiring of Premises) and OHSA safety codes.	[1-3, 9, 12, 21, 26]
Power Generation & Substation Systems	Study of thermal, hydel, and solar power plants; includes component identification (CT/PT, breakers, alternators).	Power Engineering	NSQF Level 5 Competency	NIMI / ITI / St. Peace College	Ability to draw single-line diagrams and interpret technical specifications for transmission-grade deployments.	[1, 9, 27-29]
Control Systems Design	Modeling (transfer function, state-space), stability analysis, LQR, and Kalman filters using MATLAB/Simulink.	Electrical Engineering	Postgraduate / ECSA Aligned	University of Pretoria / Purdue / AIU	Design of performance-oriented controllers; integration of state-space and frequency-domain methods.	[10, 23]
Digital Signal Processing	Advanced DSP transforms (DCT, KLT, wavelets), adaptive filtering (LMS, RLS), and multirate processing.	Electrical Engineering	Postgraduate / NQF Level 7 Aligned	NIT Warangal / Unisa / AIU	Analyze discrete signals and implement adaptive filtering via MATLAB simulations.	[10, 23]
Digital	Integration of	Digital	Doctorate in	Atlantic	Creation of audit-	[30]

Systems & VBA Automation	VBA automation for student records, engineering calculations, and PLC simulation logic.	Systems	Engineering (Candidate)	International University (AIU)	ready documentation and automated fault analysis tools for curriculum reform.	
Engineering Project Specification	Technical parameters for power meters, communication interfaces, and surge protection in facilities.	Electrical / Defense Systems	Unified Facilities Guide Specs	Department of Defense / SANDF / Eskom	Compliance with MIL-STD-462D, IEC Class 0.2 accuracy, and identifier 240-61268959.	[2, 7, 14, 29]
Electronic Practice & Technical Training	Hands-on workshop exercises for control panel wiring, motor drive commissioning, and soldering.	Vocational Training	NSQF Level 5 / Module 1-4	NIMI / SAQA / DHET Framework	Portfolio of Evidence (PoE) including wiring diagrams, fault logs, and 525 hours of training.	[2, 6, 9, 27]
Biomedical Engineering Laboratory	Design, manufacture, and repair of medical equipment using De Lorenzo didactic systems.	Biomedical Engineering	Professional Competency	De Lorenzo S.p.A.	Understanding sensors converting ion flows into electrical currents; alignment with trade test units.	[25, 31]
Supply Chain Management & Traceability	Integration of software engineering, blockchain, and IoT for supply chain digitalization.	Supply Chain Management	Master's Degree	Atlantic International University (AIU)	Implementation of security and privacy in supply chain software via real-world case studies.	[4, 5]
Mathematics & Engineering Calculus	Critical analysis of rates of change, limits, binomial expansion, and system dynamics.	Mathematics	Mathematics N4	Not in source	First and second derivatives for optimization; calculation of torque and voltage inductance.	[5, 17]
Technical	Formal	Engineering	Evidence	Schneider	Technical	[18,

Expert Assessment (TEX)	diagnostic pathway for evaluating inoperative electrical products.	Diagnostics	artifacts	Electric	assessment of electrical product failure for NQF alignment.	19]
Industrial Automation & Modicon Integration	HVAC and automation control systems using Modicon controllers and NTC sensors.	Industrial Automation	Project-Based Competency	Schneider Electric	Design of modular control architectures with End-of-Life (EOL) component management.	[29]
ICT & Technical Skills Academy	Training for youth in CCNA, Linux, IoT, and Python Essentials.	ICT / Computer Science	Certiport Expert (Office Suite)	Sci-Bono ICT Academy	Accredited programs in End User Computing and System Support.	[14]
Psychometric Grade Rank Calculation	Weighted score calculation based on cognitive ability (40%), personality (30%), and integrity (30%).	Psychometry / HR	Certified Evaluation (CPER)	SARS / SARB / 9 LINKS	Benchmarking for career readiness; variance gate ≤10; mean score ≥25.	[32]
Autotronics Training	Training panel representing the operation of engine ignition components.	Automotive Engineering	Vocational Skill Certification	De Lorenzo S.p.A. / Northlink College	Ability to troubleshoot electronic ignition control systems.	[31]
Applied Policing & Crime Resolution	Investigative techniques, evidence handling, and web-based crime management systems.	Law Enforcement	National Diploma (NQF Level 6)	ST Peace College / Samara Police	Practical assessment (70%) and theory (30%); automated data storage for crime records.	[5, 15, 16]
Voltage & Component Calculations	Calculation formulations for $V(t)=C1 \int i(t)dt +V0$ and transformer impedance $Z=R+jX$.	Electrical Engineering	National Diploma / NATED	City Power / St Peace College	Verification of calculation accuracy and adherence to IEC/SANS voltage drop limits.	[3, 16, 26, 30]
Renewable	Theoretical and	Renewable	National 5	SQA /	6 SCQF credits;	[17,

Energy: Wind & Solar	practical understanding of domestic wind turbines and PV installation.	Energy	Skills / N6	Schneider Electric	compliance with IEC 61115-1-2 and SANS 10142-1.	26]
Asset Management Automation	Digitization of infrastructure using the State Asset Information Management System (SAIMS).	Infrastructure Management	Operation GENIAC Framework	DPWI / National Treasury	Cloud-native architecture; real-time visibility and risk-based management.	[10]
NATED N1–N3 Phase-Out	Discontinuation of NATED Report 191 N1-N3 programs due to NQF misalignment.	Technical Education	NATED N1-N3	DHET	Programs ceased as of 1 January 2024; articulation to N4 Engineering Studies.	[4, 17]
Clean Energy Technology	Ecotechnology applications focusing on solar, wind, bioenergy, and geothermal systems.	Renewable Energy	Masters / Doctoral Module	Atlantic International University (AIU)	Evaluation of ecological and social implications of energy projects.	[23, 30]
Urban Water & Waste Management	Sustainable planning, water treatment, and resource recovery infrastructure.	Environmental Engineering	Master's Degree	Not in source	Skills to address population growth and climate change challenges.	[3, 13]
Public Administration Legal Studies	Constitutional law, administrative ethics, and public safety laws in the public sector.	Public Law	Master's Degree	Not in source	Understanding of legal compliance in crisis management.	[3, 13]
Information Management System (IMS)	Modular system for secure registration and biometric validation using Visual Basic.	Software Engineering	Not in source	Not in source	Secure data handling and audit-readiness aligning with national standards.	[33]
Cyber	Introduction to	Information	Diploma	Alison	Define key	[15]

Security Fundamentals	cybersecurity elements, attack techniques, and risk management.	Technology			elements of cybersecurity and risk management principles.	
Specialist Engineering Infrastructure	Advanced power system analysis, high voltage engineering, and smart grids.	Electrical Engineering	Doctorate (PhD)	Atlantic International University (AIU)	Design and management of electrical infrastructure projects.	[5, 13, 16]
SARAO Engineering Scholarships	Scholarship application for Bachelor in Electrical and Electronic Engineering Technology.	Radio Astronomy	Bachelor/Diploma	SARAO	Support for MeerKAT and SKA infrastructure.	[18, 19]
Piling Design & Construction	Technical specification for driven cast in situ piling projects.	Civil/Structural Engineering	Not in source	PWC Town Project Team	500 m/day production rate; compliance with ECSA and ISO 90000.	[8]
Intellectual Property (IP)	Registering inventions and managing IP claims with metadata for digital preservation.	Legal / IP	IP6 / Legal Depot Number	Metropolitan Police / Elektor	Validating authorship; protection status via legal depot numbers.	[33]
Dementia Care	Training on caregiving skills specifically for dementia and Alzheimer's patients.	Health Science	Certificate	Alison	Define and differentiate forms of dementia and stages of Alzheimer’s.	[15]

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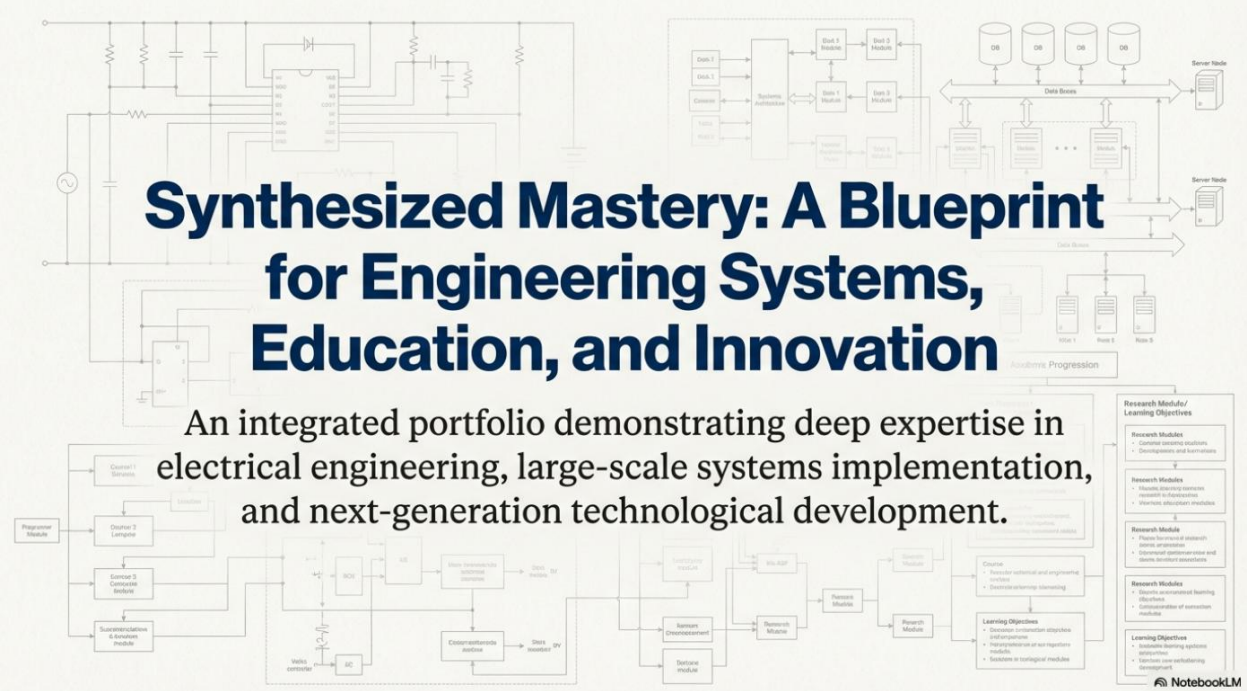
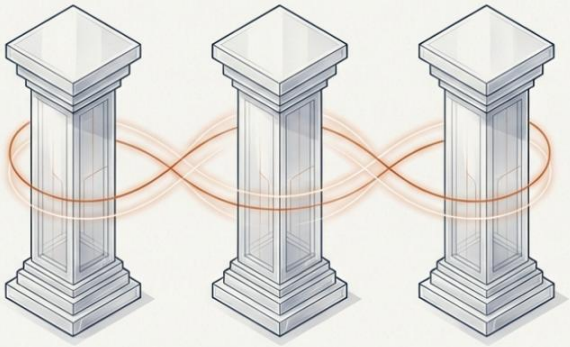

Synthesized Mastery: A Blueprint for Engineering Systems, Education, and Innovation
An integrated portfolio demonstrating deep expertise in electrical engineering, large-scale systems implementation, and next-generation technological development.
NotebookLM

An Intentional Synthesis of Disciplines

This body of work represents the deliberate integration of three distinct but interconnected domains of mastery:

1. Deep Electrical Engineering

A rigorous foundation in the theoretical and practical principles governing electrical systems.



3. Education & Future Systems

A commitment to scaling expertise through education and driving innovation at the frontier of technology.

2. Broad Systems Implementation

The application of core knowledge to design and manage complex socio-technical systems in public and private sectors.

NotebookLM

The Foundation: Mastering the Physics of Electrical Systems

A Rigorous Grounding in Engineering Mathematics and Theory

Academic Progression

- N1
- N2
- N3
- N4
- N5
- N6

Key Theoretical Domains

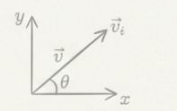
Advanced Mathematics (N4-N6)

Application of differential and integral calculus, partial fractions, and differential equations to solve complex engineering problems.

$$\int f(x)\,dx \qquad \frac{dy}{dx} = \frac{(-y)^2}{c}$$

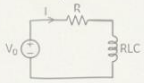
Engineering Science (N4)

Mastery of kinematics, dynamics, hydraulics, and stress/strain principles.



Electrotechnics (N4)

In-depth analysis of RLC circuits, DC/AC machines, and network theorems (e.g., Kirchhoff's Laws).



Evidence Panel

- **Qualifications***: NATED N1-N6 Diploma Track
- **Key Subjects***: Mathematics N6, Engineering Science N4, Electrotechnics N4
- **Core Concepts***: Maxwell's Equations, Fourier Transforms, Laplace Transforms, Ohm's Law

NotebookLM

The Foundation: Mastering the Physics of Electrical Systems

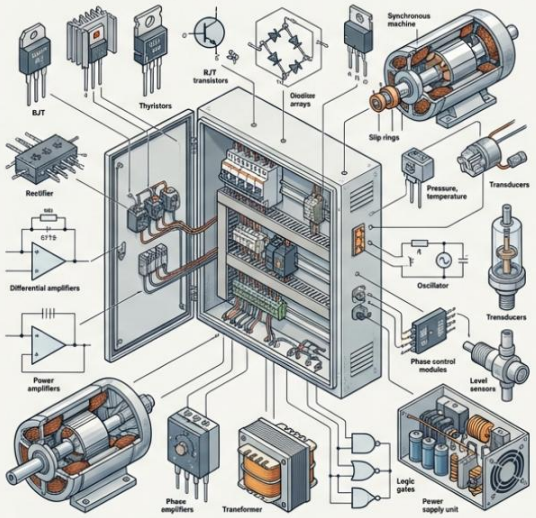
Applied Mastery: From Trade Theory to Industrial Electronics

Trade-Specific Knowledge

- **Electrical Trade Theory (N3):** Principles of electrical installation, maintenance, safety, circuit design, and troubleshooting techniques.
- **Industrial Electronics (N5):** Expertise in amplifiers (differential, integrator), thyristors, transducers, oscillators, and phase control systems.

Component & System Expertise

- Deep understanding of DC/AC Machines, Transformers, and Power Supplies.
- Knowledge of digital logic systems, including Boolean algebra and logic gates.



Evidence Panel

Key Subjects: Electrical Trade Theory N3, Industrial Electronics N5
Regulatory Standard: SANS 10142-1 (The South African National Standard for the wiring of premises)
Components: Transistors, Rectifiers, Amplifiers, Synchronous Machines, Transducers

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The Application: Engineering Complex Socio-Technical Systems

Designing for Society: Modernizing Public Infrastructure

Traffic Signal Systems

1. Candidate Site Identification & Warranty Study
2. Signal Design (including geometric improvements and land surveys)
3. Installation Supervision & Contractor Management
4. Commissioning & Final Inspection

Power & Metering Systems

- Design of building-mounted metering systems.
- Expertise in lightning protection and soil resistivity measurement.
- Compliance with international standards for electromagnetic compatibility and surge protection.

Evidence Panel
Engagements: City Power, Eskom
Key Standards: IEC 61000-4-5 (EMC Testing), IEC 62053-22 (Electricity Metering), SANS Rules

NotebookLM

The Application: Engineering Complex Socio-Technical Systems

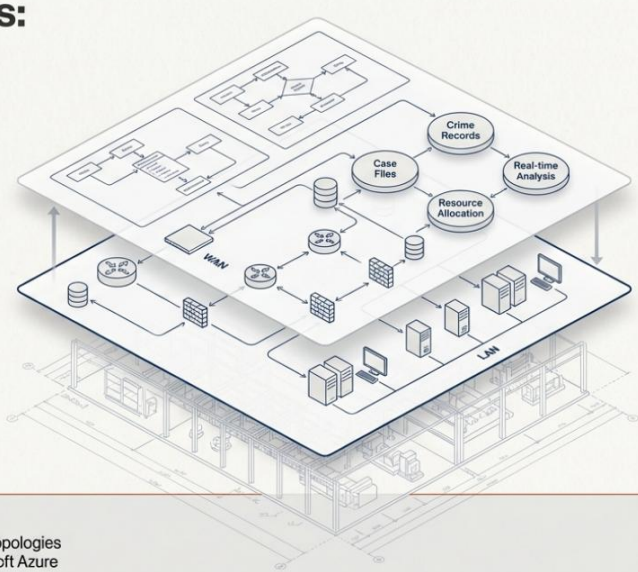
Building Intelligent Systems: From Data Architecture to Industrial Control

Police Management Information Systems

- **Architecture:** Designing systems using Data Flow Diagrams (DFD) and Entity-Relation (ER) diagrams to manage crime records, case files, and resource allocation.
- **Networking:** Implementing secure Wide Area Network (WAN) and Local Area Network (LAN) topologies.
- **Objective:** To enhance e-government capabilities, improve public safety, and enable real-time crime data analysis.

Industrial Automation & Control

- Completed training and configuration of Schneider Electric systems, including EcoStruxure Power, Modicon M340 processors, and motor starters (variable speed drives).
- Knowledge of Eaton's power system products and field service engineering principles.



Evidence Panel
Concepts: Data Flow Diagrams, Entity-Relation Diagrams, WAN/LAN Topologies
Technologies: Schneider Electric EcoStruxure, Modicon M340, Microsoft Azure
Projects: E-Police System Design, Motor Control Configuration

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The Multiplier: Scaling Expertise Through Education & Mentorship

A Portfolio of Continuous Professional Development

Microsoft

MCID: 99587175

Credentials: Level 18, 1,225,400+ XP

Completed Training: Introduction to Data Engineering on Azure; Configure Network Security; Perform Device Investigation in Microsoft Defender.

Schneider Electric

Completed Training:

EcoStruxure Power: Energy Modeling & Verification

Drives Fundamentals of Kinematic Calculation

Physical Infrastructure Management Basics

Heating, Ventilation, and Airborne Disease Transmission

ISC² BrightTalk

ISC²: Certified in Cybersecurity

BrightTalk: Certificates of Attendance in "Next Generation of SASE," "Generative AI and Enterprise IT," "Inside the Mind of a Hacker."

Alison: Numerous certificates in Electrical Engineering topics, including Transformer Components and Basics of Electrical Technology.

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The Vision: Innovating at the Intersection of Engineering and Intelligence

Forward Trajectory: A Doctoral Focus on Next-Generation Systems

Proposed Doctoral Research

Primary Fields: A synergistic focus on Power Systems, Control Systems, Telecommunication, and Embedded Systems.

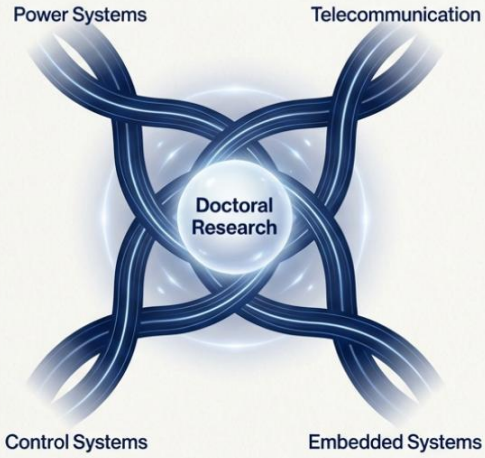
Research Goal: "To contribute new knowledge or solutions to existing challenges in the electrical and electronics field."

Institutional Engagement

Actively pursuing a Master's / Doctoral degree through Atlantic International University (AIU), an institution emphasizing customized, andragogic (self-directed) curriculum design.

Advanced Coursework

- Advanced Electromagnetic Theory
- Digital Signal Processing
- Control Systems Design
- VLSI (Very Large Scale Integration) Design



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The Vision: Innovating at the Intersection of Engineering and Intelligence

Mastering the Digital Frontier: AI, Cybersecurity, and Advanced Architectures

Artificial Intelligence & Machine Learning

Studied applications of ML in Electrical Engineering, including optimization of energy efficiency, modulation, and signal processing. Explored AI-powered systems for e-commerce, product recommendations (collaborative filtering), and generative AI for enterprise IT.

Cybersecurity & Information Assurance

Formal certification from ISC2 (Certified in Cybersecurity). Explored advanced topics such as Ethical Hacking, Penetration Testing, quantum cryptography, and zero-trust security models.

Advanced System Architectures

Studied the application of Distributed-Ledger Technologies (DLT/Blockchain) in educational technology for secure credentialing. Analyzed Cyber-Physical Systems (CPS) in telecommunications and smart grids. Researched the role of IoT and Robotic Process Automation (RPA) in creating smart supply chains and electrical systems.

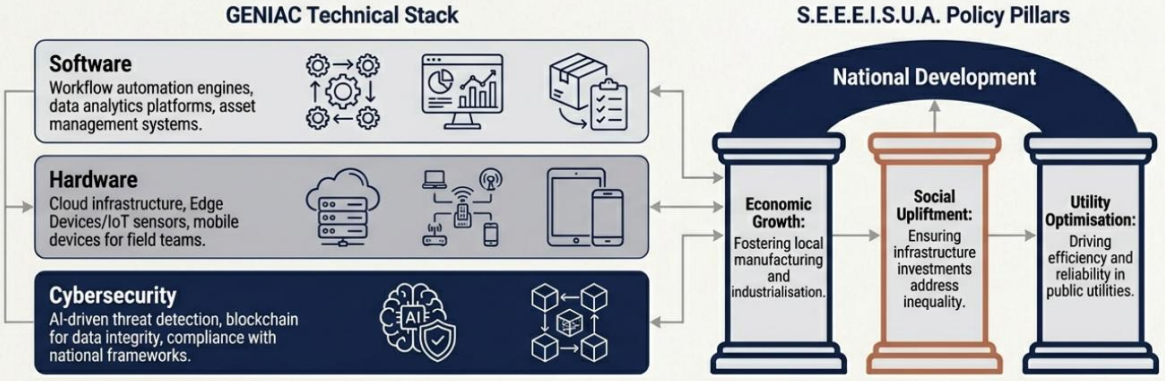
Evidence Panel

Concepts: Machine Learning, DLT/Blockchain, Cyber-Physical Systems, IoT, Zero-Trust Models
Certifications: ISC2 Certified in Cybersecurity

NotebookLM

A Strategic Proposal: Operation GENIAC & S.E.E.E.I.S.U.A. Integration

A proposal for a fully integrated, automated national system for Governance, Engineering, National Infrastructure, Asset Control (GENIAC) and its policy framework, the Synthesized Economic, Engineering, Educational, Industrial, and Social Upliftment Architecture (S.E.E.E.I.S.U.A.).


GENIAC Technical Stack
Software
Workflow automation engines, data analytics platforms, asset management systems.
Hardware
Cloud infrastructure, Edge Devices/IoT sensors, mobile devices for field teams.
Cybersecurity
AI-driven threat detection, blockchain for data integrity, compliance with national frameworks.
AI
S.E.E.E.I.S.U.A. Policy Pillars
National Development
Economic Growth:
Fostering local manufacturing and industrialisation.
Social Upliftment:
Ensuring infrastructure investments address inequality.
Utility Optimisation:
Driving efficiency and reliability in public utilities.

Initial Application: The Madinda Utilities Advanced Metering Infrastructure (AMI) Rollout, showcasing remote configuration, RFID asset tagging, and high-level security (IEC 62056-5-3).

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The Synthesized Expert: A Blueprint for Impact

The journey from NATED qualifications to designing national automation frameworks is not a random collection of skills, but a **story of intentional synthesis**. This portfolio demonstrates a unique capability to bridge deep engineering principles with complex societal needs.

Ready to design, implement, and lead complex socio-technical projects that generate lasting value.

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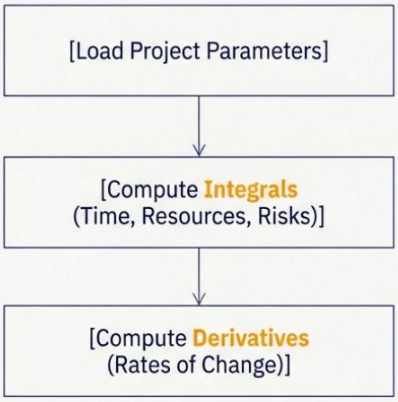
The Applied Engine: From Theory to Measurable Application

The Applied Engine translates didactic learning into practical, measurable outcomes. It provides tools for project planning, resource management, and cost projection, ensuring every application of knowledge is tracked and quantified.



Project Planning

Total Time: $T = \int_0^N t_i di$

Resource Management

Total Consumption: $R = \int_0^T r(t) dt$

Cost Projection

Total Cost: $C_{\text{total}} = \sum (M_{\text{material}} + H_{\text{human}} + S_{\text{stationery}} + B_{\text{building}})$

NotebookLM

The Engine's Source Code: Verifiable Logic in Visual Basic

The system's backend is built on robust, auditable code. These VBA modules automate calculations for everything from renewable energy harvesting to project cost estimation, creating a verifiable record of applied knowledge.

Renewable Energy & Smart Grid Functions

```
' Renewable Energy: Wind Harvest
Function WindEnergyHarvest(rho, A, v, eta, duration) As Double
    WindEnergyHarvest = 0.5 * rho * A * (v ^ 3) * eta * duration
End Function

' Solar Efficiency
Function SolarEfficiency(Egenerated, Eincident) As Double
    ...
End Function
```

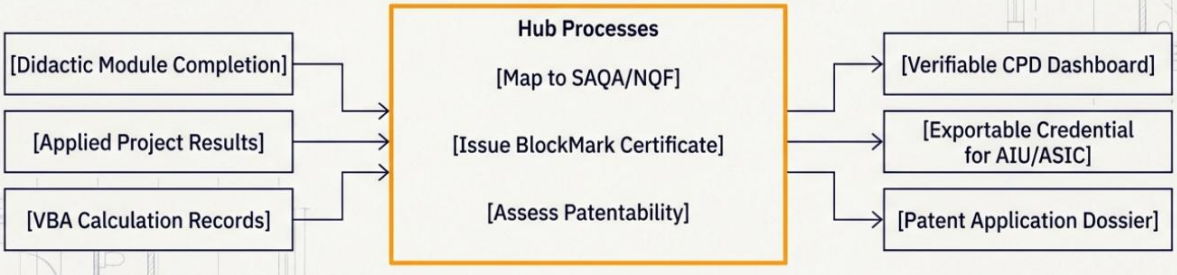
Project Cost Estimation Logic

```
' Estimate Total Project Cost
...
"Human Resource: " & FormatCurrency(entry.HumanResourceCost)
"Material: " & FormatCurrency(entry.MaterialCost)
"Building / Infrastructure:" & FormatCurrency(entry.BuildingCost)
"Total Cost: " & FormatCurrency(EstimateTotalProjectCost(...))
```

NotebookLM

The Credentialing & IP Hub: Verifying Mastery and Ownership

All structured learning and applied work culminates in the Credentialing & IP Hub. This pillar formalizes achievement through interoperable digital certificates, maps competencies to national qualification frameworks, and provides a structured process for managing intellectual property.



Bilingual & Legacy Ready

The system generates a bilingual (English/French) career portfolio and legacy-ready export formats.

NotebookLM

The Mechanics of Verification: Blockchain-Ready Credentials

The system integrates with third-party services like BlockMark Technologies to issue secure, verifiable digital certificates. This process supports both expiring (e.g., annual CPD) and non-expiring credentials, with options for premium blockchain features.

BlockMark Certificate Issuance Price List (VAT Excl.)

Item	Price (credits)	Paid for by
Issue a certificate with an expiry date	£1 (100) per year	Issuer
Issue a non-expiring certificate	£10 (1000)	Issuer
Issue a CPD folder with a certificate	£1 (100) per year	Issuer
Stamp a hash of an issued certificate on blockchain	£1 (100)*	Issuer

*Coming soon (currently beta-testing with no charge)

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From Research to Asset: A Structured Path to Patentability.

Beyond credentials, the hub manages the lifecycle of intellectual property. It aligns with international patent standards, tracking research methodology and assessing inventions against key criteria to create an audit-ready trail for patent applications.

Patentability Criteria

1. **Novelty**: Not publicly disclosed before filing.
2. **Utility**: Must function and serve a useful purpose.
3. **Inventive Step**: Not obvious to a skilled professional in the field.

Reference: `URFIST Paris` patent tutorials and `Espacenet` database for prior art searches.

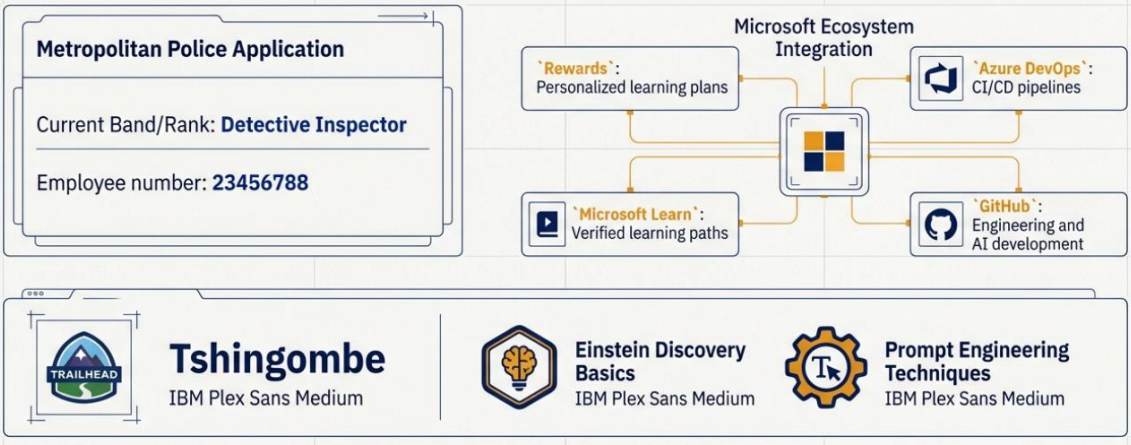
VBA Logic for Patent Tracking

```
' Module: Research and Patent Lifecycle Tracker
Type ResearchPatentProject
    ProjectID As String
    ScopeDefined As Boolean
    MethodologySet As Boolean
    PatentNovelty As Boolean
    PatentUtility As Boolean
    PatentInventiveStep As Boolean
    PatentFiled As Boolean
    CertificationStatus As String
End Type
```

NotebookLM

The Professional's Journey: Tshingombe's Integrated Career Engine.

The system is designed to be a lifelong career co-pilot. For a professional like **Tshingombe**, it integrates disparate platforms into a single, credential-linked engine, supporting everything from job applications to advanced engineering certifications.



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Mapping to National Standards: The SAQA NQF Level 3 Electrical Engineering Certificate.

The platform's data model is designed to align with rigorous national qualification frameworks, such as the South African Qualifications Authority (SAQA). It maps every learning activity and competency to specific unit standards, ensuring full compliance and auditability.

SAQA ID 63790: National Certificate: Electrical Engineering (NQF Level 3, 133 Credits)			
Component	**Unit Standard ID**	**Title**	**Credits**
Core	258963	Install, test and maintain electrical equipment in a hazardous location	10
Core	113924	Install and commission DC and AC machines and control gear	10
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	5
Elective	259097	Carry out a detailed inspection and repair defects on explosion prevention apparatus	6

NotebookLM

International Application: The French Brevet de Technicien Supérieur (BTS) in Electrotechnics

The system's architecture is adaptable to diverse international standards, including European vocational qualifications. It breaks down complex roles into a granular set of professional activities and certified competencies.

Professional Activities

- **Étude - Conception préliminaire** *Preliminary study & design*
- **Conception - étude détaillée du projet** *Detailed project design*
- **Analyse – diagnostic** *Analysis – diagnostic*
- **Maintenance d'une installation électrique** *Maintenance of an electrical installation*
- **Conduite de projet/chantier** *Project management*
- **Réalisation : installation – intégration** *Realization: installation – integration*
- **Mise en service** *Commissioning*
- **Communication** *Communication*

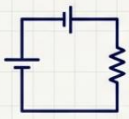
Certified Competencies

- **Modéliser le comportement de tout ou partie d'un ouvrage** *Model system behavior*
- **Dimensionner les constituants** *Dimension components*
- **Proposer l'architecture d'un ouvrage** *Propose system architecture*
- **Gérer et conduire le projet/chantier** *Manage the project*
- **Réaliser un diagnostic de performance** *Perform a diagnostic*

NotebookLM

Bridging Didactics and Practice: The UniTrain-I and InsTrain Simulation Environment

The system integrates with hands-on training platforms like the Lucas-Nülle UniTrain and InsTrain systems. Practical skills—from fault simulation in building automation to diagnostics on three-phase systems—are logged, evaluated, and certified.



DC Technology

AC Technology

Three-Phase Technology

KNX® Building Automation

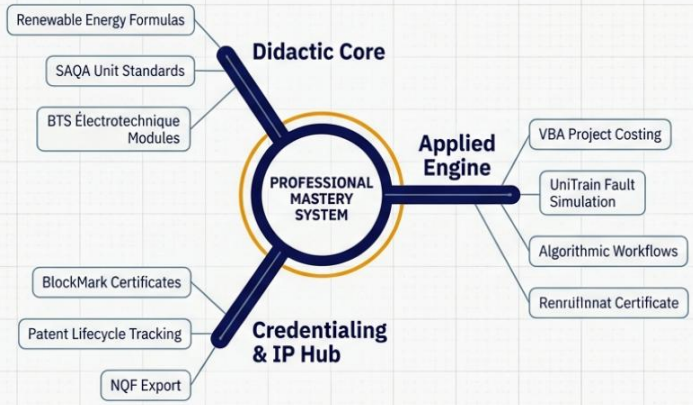
```
' Module: UniTrainICredentialTracker
' Purpose: Automate training progress, fault simulation, and credentialing

Type UniTrainTrainee
    Name As String
    CourseCode As String
    DC_Module As Boolean
    AC_Module As Boolean
    ThreePhase_Module As Boolean
    FaultsResolved As Integer
    TotalFaults As Integer
    CertificationStatus As String
End Type
```

NotebookLM

A Complete System of Systems for Professional Mastery

By integrating the Didactic Core, Applied Engine, and Credentialing Hub, the platform creates a closed-loop system for continuous development. Every skill learned is applied, every application is measured, and every achievement is verifiably certified.



Key Value Propositions

- **Audit-Grade Traceability**: From lesson plan to final credential.
- **Integrated Learning**: Seamlessly connecting theory, simulation, and practice.
- **Verifiable Credentials**: Portable, secure, and mapped to global standards.
- **Lifelong Portfolio Management**: A dynamic record of career achievement and innovation.

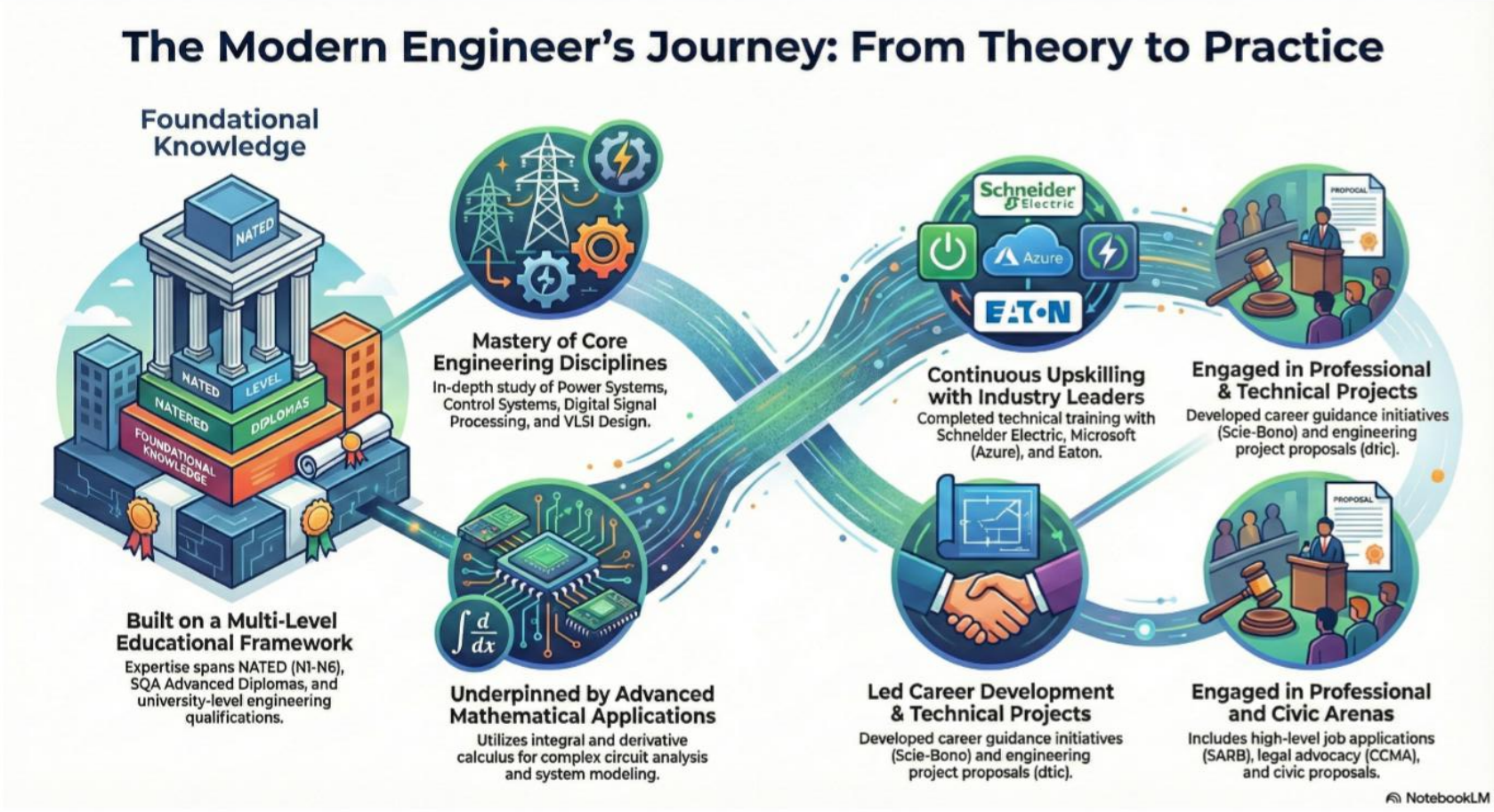
NotebookLM

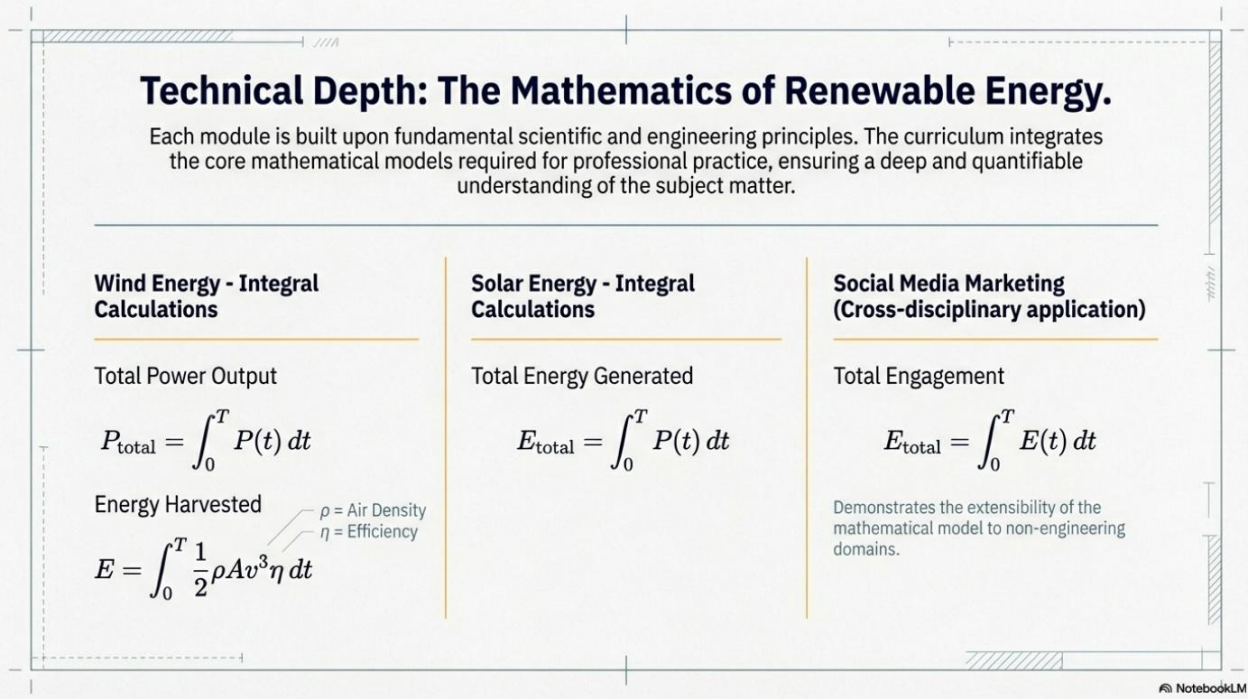
The Professional's Lifelong Ledger

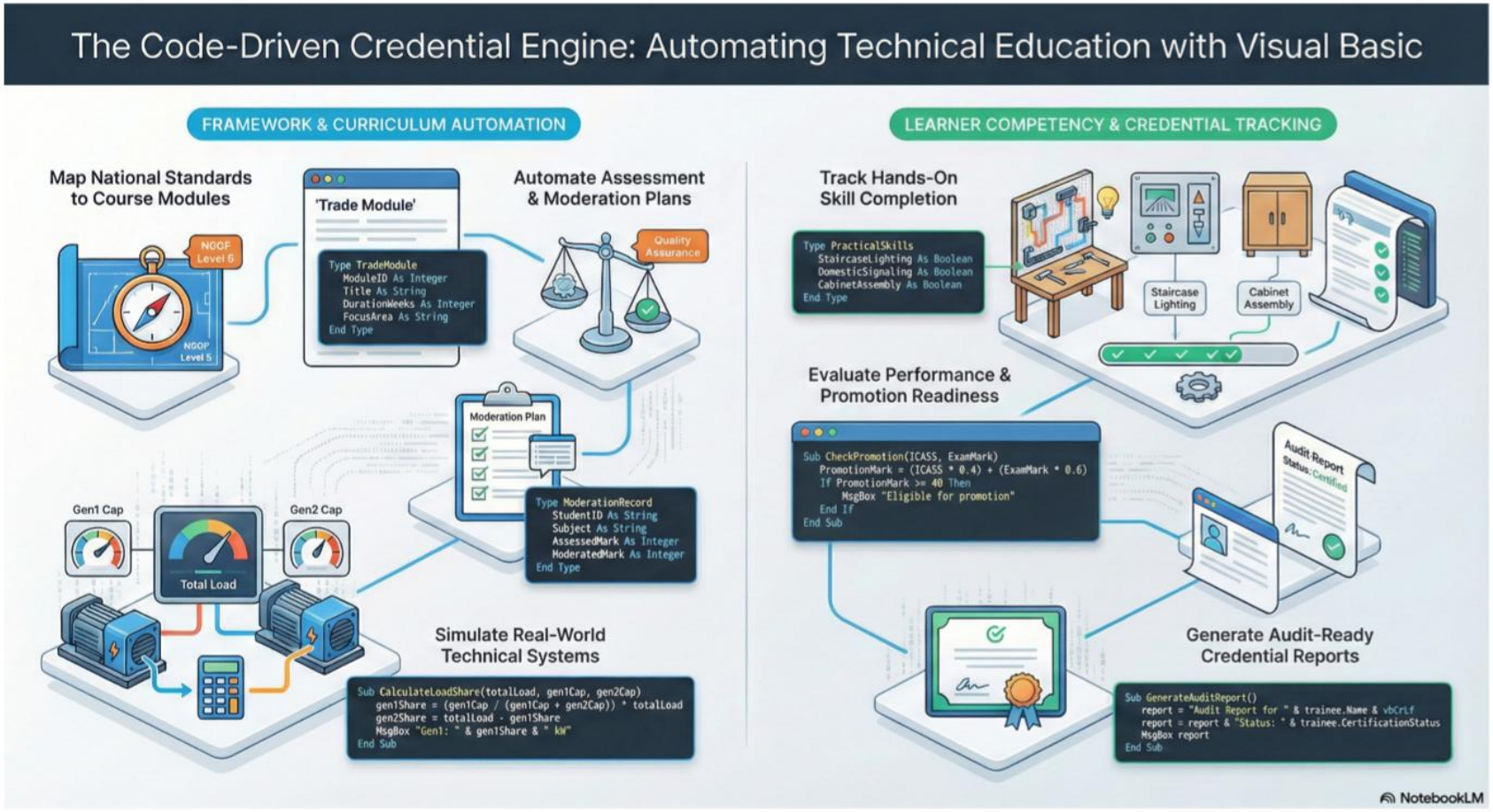
This is more than a system; it is a permanent, dynamic, and verifiable record of an individual's accumulated knowledge, practical skill, and innovative contributions. It is the definitive ledger of human potential, realized and proven.

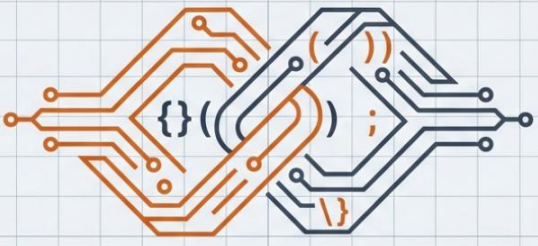
Building the architecture for proven expertise.

NotebookLM


The Modern Engineer's Journey: From Theory to Practice
Foundational Knowledge
NATED
NATED LEVEL
NATERED DIPLOMAS
FOUNDATIONAL KNOWLEDGE
Built on a Multi-Level Educational Framework
Expertise spans NATED (N1-N6), SQA Advanced Diplomas, and university-level engineering qualifications.
Mastery of Core Engineering Disciplines
In-depth study of Power Systems, Control Systems, Digital Signal Processing, and VLSI Design.
$\int \frac{d}{dx}$
Underpinned by Advanced Mathematical Applications
Utilizes integral and derivative calculus for complex circuit analysis and system modeling.
Schneider Electric
Azure
EATON
Continuous Upskilling with Industry Leaders
Completed technical training with Schnelder Electric, Microsoft (Azure), and Eaton.
Led Career Development & Technical Projects
Developed career guidance initiatives (Scie-Bono) and engineering project proposals (dtic).
PROPOSAL
Engaged in Professional & Technical Projects
Developed career guidance initiatives (Scie-Bono) and engineering project proposals (dtic).
PROPOSAL
Engaged in Professional and Civic Arenas
Includes high-level job applications (SARB), legal advocacy (CCMA), and civic proposals.
NotebookLM


Technical Depth: The Mathematics of Renewable Energy.
Each module is built upon fundamental scientific and engineering principles. The curriculum integrates the core mathematical models required for professional practice, ensuring a deep and quantifiable understanding of the subject matter.
Wind Energy - Integral Calculations
Total Power Output
$P_{\text{total}} = \int_0^T P(t)\,dt$
Energy Harvested
$E = \int_0^T \frac{1}{2}\rho A v^3 \eta\,dt$
ρ = Air Density
η = Efficiency
Solar Energy - Integral Calculations
Total Energy Generated
$E_{\text{total}} = \int_0^T P(t)\,dt$
Social Media Marketing (Cross-disciplinary application)
Total Engagement
$E_{\text{total}} = \int_0^T E(t)\,dt$
Demonstrates the extensibility of the mathematical model to non-engineering domains.
NotebookLM


The Code-Driven Credential Engine: Automating Technical Education with Visual Basic
FRAMEWORK & CURRICULUM AUTOMATION
LEARNER COMPETENCY & CREDENTIAL TRACKING
Map National Standards to Course Modules
NQOF Level 6
NQOF Level 5
'Trade Module'
Type TradeModule
ModuleID As Integer
Title As String
DurationWeeks As Integer
FocusArea As String
End Type
Automate Assessment & Moderation Plans
Quality Assurance
Moderation Plan
Type ModerationRecord
StudentID As String
Subject As String
AssessedMark As Integer
ModeratedMark As Integer
End Type
Gen1 Cap
Total Load
Gen2 Cap
Simulate Real-World Technical Systems
Sub CalculateLoadShare(totalLoad, gen1Cap, gen2Cap)
gen1Share = (gen1Cap / (gen1Cap + gen2Cap)) * totalLoad
gen2Share = totalLoad - gen1Share
MsgBox "Gen1: " & gen1Share & " kW"
End Sub
Track Hands-On Skill Completion
Type PracticalSkills
StaircaseLighting As Boolean
DomesticSignaling As Boolean
CabinetAssembly As Boolean
End Type
Staircase Lighting
Cabinet Assembly
Evaluate Performance & Promotion Readiness
Sub CheckPromotion(ICASS, ExamMark)
PromotionMark = (ICASS * 0.4) + (ExamMark * 0.6)
If PromotionMark >= 40 Then
MsgBox "Eligible for promotion"
End If
End Sub
Audit Report
Status: Certified
Generate Audit-Ready Credential Reports
Sub GenerateAuditReport()
report = "Audit Report for " & trainee.Name & vbCrLf
report = report & "Status: " & trainee.CertificationStatus
MsgBox report
End Sub
NotebookLM



Convergence & Resilience: A Profile in Systems Engineering and Applied Problem Solving

An integrated approach to solving complex challenges at the intersection of

An integrated approach to solving complex challenges at the intersection of
electrical engineering, software development, and systems analysis.

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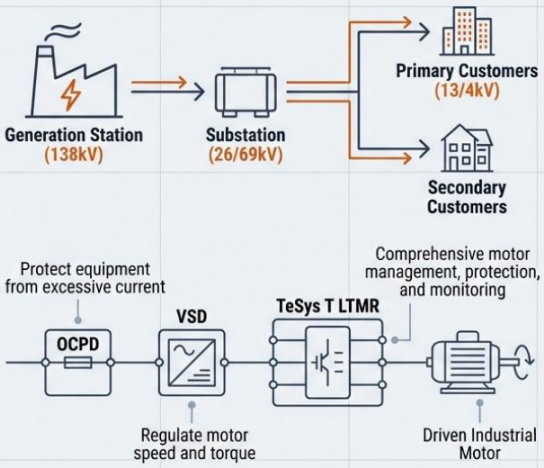
Mastering Electrical Power Systems from Generation to Industrial Application

- **Power Distribution Architecture**: Designing and analyzing systems from generation stations (138kV) through substations (26kV, 69kV) to primary (13kV, 4kV) and secondary customers.
- **Industrial Motor Control**: Implementation and configuration of motor management controllers (e.g., TeSys T LTMR), including wiring diagrams, parameter setting, and safety considerations (OCPD, VSD).
- **PV Installation Design**: System planning for photovoltaic installations ranging from 6.5kW to 250kW grid-tied systems.
- **Component & System Schematics**: Creating detailed electrical engineering diagrams for circuits, logic, and industrial controls.



NotebookLM

Applying Software to Automate and Solve Complex Operational Problems

Automated Student Registration System (Excel/VBA)

A database-driven system in Excel and VBA for managing student registrations.

- UserForm for data entry (`frm dataentry`), validation checks (`Function ValidEntry()`), data submission to a database sheet, and form reset capabilities (`Sub Reset_Form()`).

Validation Snippet (VBA)

```
Function ValidEntry() As Boolean
   ValidEntry = True
   If Trim(.txtStudentName.Value) = "" Then
      MsgBox "Please enter Student's name."
      .txtStudentName.BackColor = vbRed
      ValidEntry = False
      Exit Function
   End If
End Function
```

Functional Calculator Application (Visual Basic)

A calculator built in Visual Basic to demonstrate UI design and event-driven programming.

- Interface with text fields and buttons. Logic handles mathematical operations using `Select case [operator]` and variable declarations (`Dim operand1 as double`).

Core Logic (Visual Basic)

```
Select Case [operator]
   Case "+"
      Result = operand1 + operand2
      txtinput.text = Result.ToString
   Case "*"
      Result = operand1 * operand2
      txtinput.text = Result.ToString
End Select
```

NotebookLM

Bridging Hardware and Software Through Industrial PLC Communication

Command string:

- **Project Focus:** PLC Communication Programme for Data Read/Write Operations (C#).
- **Core Functionality:** Establishes a connection to a PLC via IP address, then constructs and sends specific command strings to read or write data to PLC memory addresses.

NotebookLM

Case Study: The Three-Phase Smart Meter

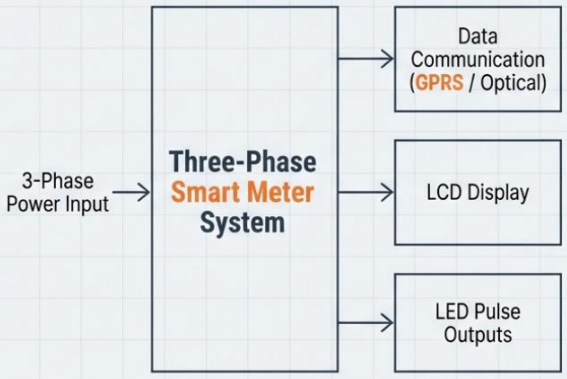
A comprehensive project demonstrating the convergence of embedded systems hardware, firmware architecture, and electrical theory.

Project Overview

- A four-quadrant, three-phase AC static watt-hour smart meter designed for low-power, real-time operation.
- Integrates metering algorithms, data processing, multiple communication interfaces, and tamper detection features.

Key Project Components

Hardware Design | Software & Firmware | Metering Theory | Bill of Materials | Performance & Accuracy



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Grounded in Fundamental Electrical Theory and Built to Precise Specifications

Core Metering Principles

Active Energy: $W_H = \int u(t) \cdot i(t)\, dt$

Reactive Energy: $varh = \int u(t\text{-}90°) \cdot i(t)\, dt$

Active Power: $P = \frac{1}{T} \int u(t) \cdot i(t)\, dt$

Apparent Power: $S = I_{RMS} \cdot U_{RMS}$

$S = \sqrt{P^2 + Q^2}$

Key Technical Specifications

Type	Three-Phase AC Static Watt-Hour Smart Meter
Accuracy	Class 0.5 (0.5%)
Nominal Voltage	240 VAC (+20%)
Current Range	0-60A (10A nominal, 72A dynamic range)
Frequency	50Hz (±5%)
Communication	GPRS Module (1x SIM card) & IEC 62056 Infrared Interface
Data Memory	256kb External EPROM (M24M02)
Functionality	Measures V, A, kW, kVAR, VA, kWh (import/export), kVAh (import/export)

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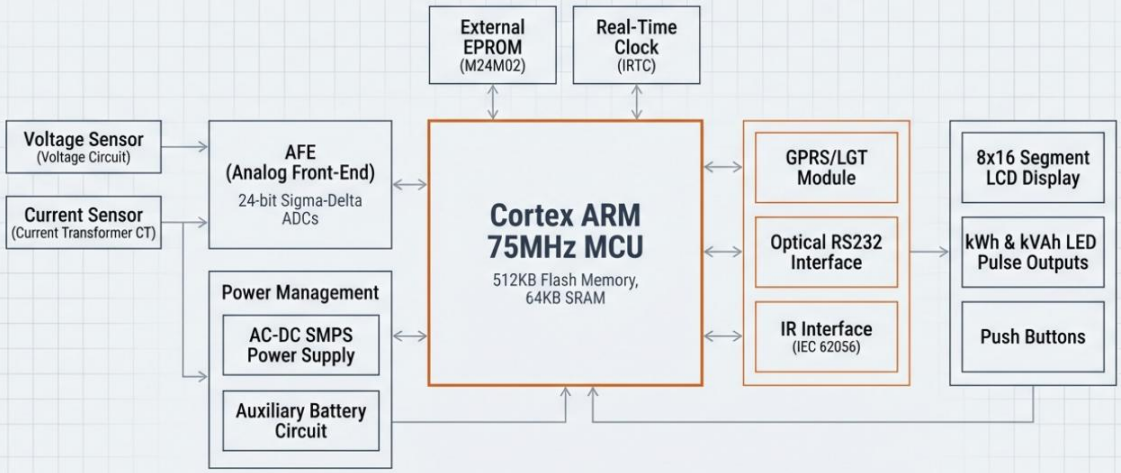
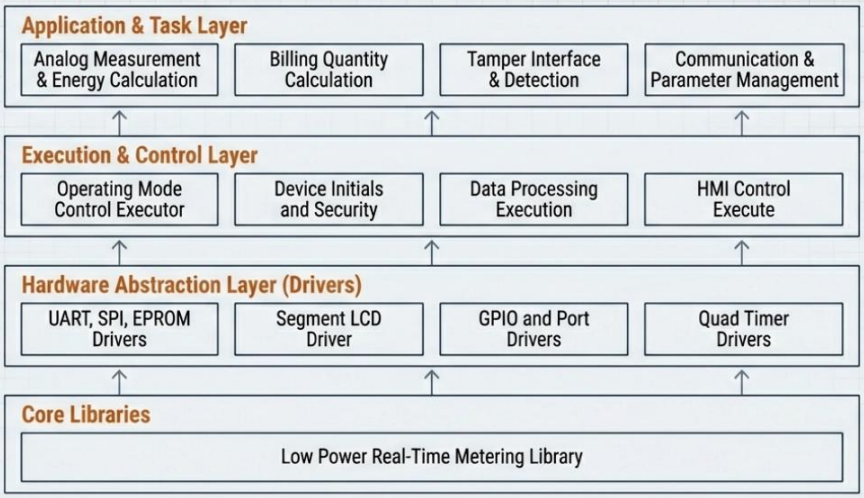
Designing the Smart Meter: A Detailed Hardware & Component Architecture



NotebookLM

Engineering the Intelligence: A Multi-Layered Firmware Architecture



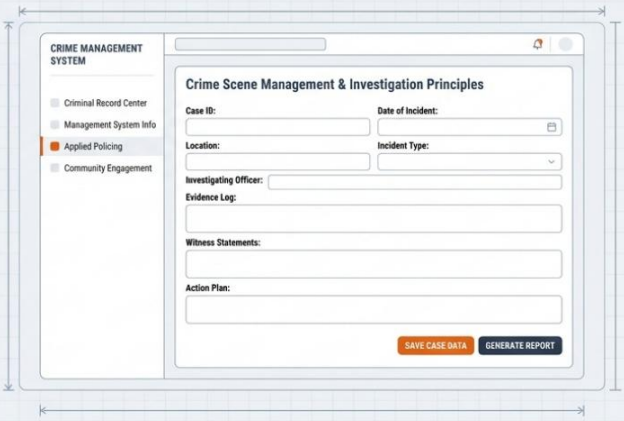
NotebookLM

Applying Systems-Thinking to Public Safety and Crime Management

Project Concept: A Web-Based Crime Management System for Police Operations.

System Modules

- **Criminal Record Center:** Centralized database for criminal records.
- **Management System Information:** Tools for operational analysis and reporting.
- **Applied Policing & Crime Resolution:** Modules for case management and investigation principles.
- **Community Policing & Engagement:** Features to facilitate communication and information sharing with citizens.
- **Experimental Applications:**
  - Simulate crime data entry and analysis.
  - Develop crime heatmaps to identify hotspots and allocate patrols effectively.



NotebookLM

Demonstrating Tenacity Through Direct Engagement with Complex Legal and Administrative Systems

A Record of Formal System Navigation: This dossier presents a history of engaging with various governmental and judicial bodies to address professional and administrative disputes.

Case Context: Filings relate to issues including workplace violence, educational backlogs, work permit conditions, and enforcement of CCMA awards.

High Court of South Africa

- Appellant in Appeal Case Numbers **Ja 37/19** and **Ja 2461/15**.

Department of Justice (DOJ) Online Portals

- Multiple Protection Order applications (e.g., URN **4702024FCV001046**) related to workplace disputes.
- Numerous Civil Law filings (e.g., URNs **1042024CIV004539**, **112024CIV000013**, etc.).

Commission for Conciliation, Mediation and Arbitration (CCMA)

- Engaged in multiple proceedings, including review applications and rescission rulings.

Other Engaged Bodies

- Department of Labour
- Department of Higher Education
- **SAQA** (South African Qualifications Authority)
- **PSIRA** (Private Security Industry Regulatory Authority)

NotebookLM

Meticulous Documentation and Process Adherence in Formal Proceedings

Demonstrating a Systematic Approach: The same structured and detail-oriented methodology used in engineering is applied to navigating legal and administrative processes.

Exhibit A: Court Filing Index

Case Ja 37/19

- Notice of motion
- Affidavit in support of application
- Recording transcription
- Application for leave to appeal head argument
- Proof of service

Highlighting the structured, evidence-based nature of legal submissions.

Exhibit B: Formal Application Process

SOUTH AFRICAN POLICE SERVICE
APPLICATION FOR APPOINTMENT

Personal Particulars

Name: Age:
ID Number: ID Name: etc:
Preceesment Number:
Company name:

Career History

Have you ever been found guilty in a disciplinary matter? ☑ YES

Demonstrating compliance with rigorous bureaucratic disclosure requirements.

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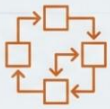
A Unique Convergence of Deep Technical Expertise and Proven Resilience

An engineer who not only designs and builds complex electro-mechanical and software systems but also possesses the demonstrated fortitude to analyze, navigate, and resolve challenges within complex human systems.

Key Capabilities

1. Foundational Engineering: Deep expertise in electrical power, industrial controls, and electronics.

2. Applied Software Development: Versatility in creating practical applications (VBA, VB.NET) and industrial communication protocols (PLC).



3. Integrated Systems Design: Proven ability to architect a complete embedded system, from theoretical concept to hardware and firmware, as shown in the Smart Meter case study.

4. Systemic Resilience: A documented history of methodical, persistent, and direct engagement with legal, administrative, and regulatory frameworks.

UNDERSTANDING PROTECTION ORDERS IN SOUTH AFRICA: YOUR LEGAL PATH TO SAFETY
WHICH PROTECTION ORDER DO YOU NEED?
Domestic Violence Protection Order (DPO)
For abuse from someone you have a domestic relationship with (e.g., family, partner, roommate).
RELATIONSHIP REQUIRED?
Yes, a domestic relationship is required.
PATTERN OF ABUSE?
Requires a pattern of abosive actions.
EXAMPLES:
Physical, sesual, financial, emotional abuss.
Harassment Protection Order (HPO)
Neighbor/Stalker
For abuse from someone you are not in a domestic relationship with (e.g., a neighbor).
RELATIONSHIP REQUIRED?
No relationship is required.
PATTERN OF ABUSE?
A single incident can be sufficient.
EXAMPLES:
Unvented messages, stalking, financial harm.
THE PROCESS TO GET A PROTECTION ORDER
1. APPLY AT THE MAGISTRATE'S COURT
Form 3
Complete the required application form (Form 2) with a detailed affidavit explaining the abuse.
2. OBTAIN AN INTERIM ORDER
INTERIM ORDER
The court reviews your application and may issue a temporary order for immediate protection.
3. SERVE THE ORDER
SERVED
The interim order must be officially served on the respondent by a sheriff or police officer.
4. ATTEND THE COURT HEARING
The court hears evidence to decide whether to grant a permanent, final protection order.
5. WHAT IF THE ORDER IS VIOLATED?
Breaching a protection order is a criminal offense punishable by a fine or up to 5 years in prison.
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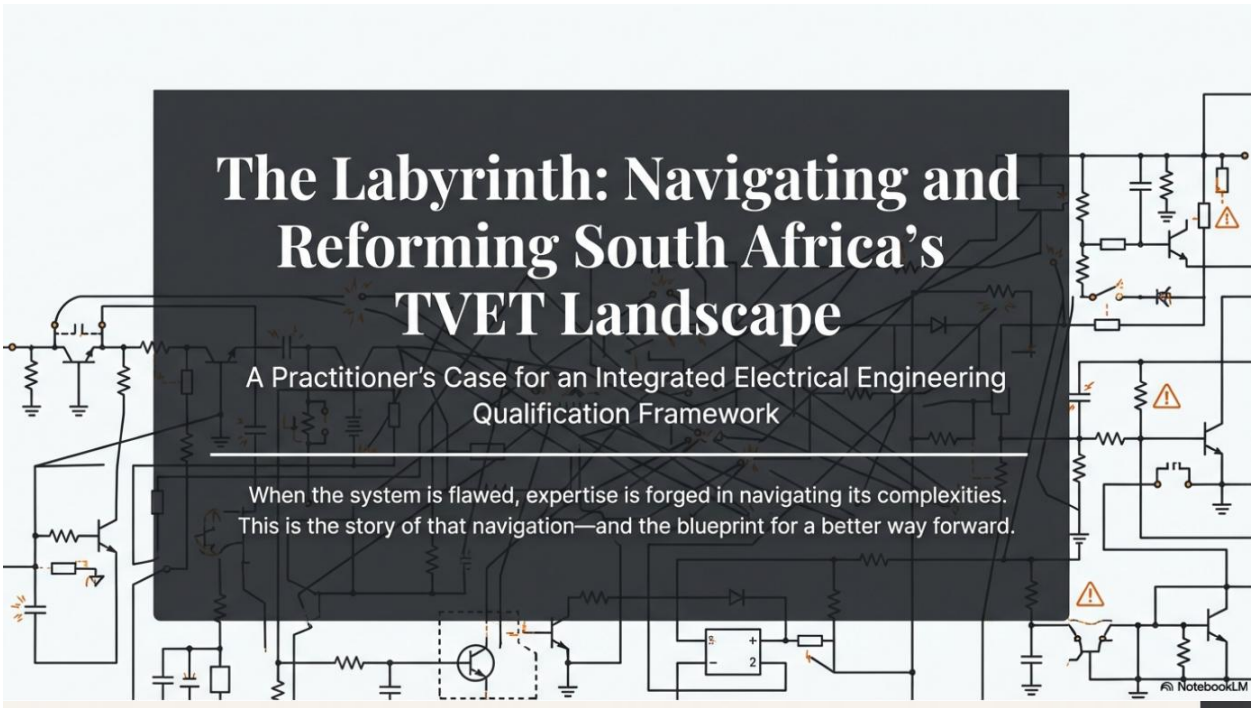
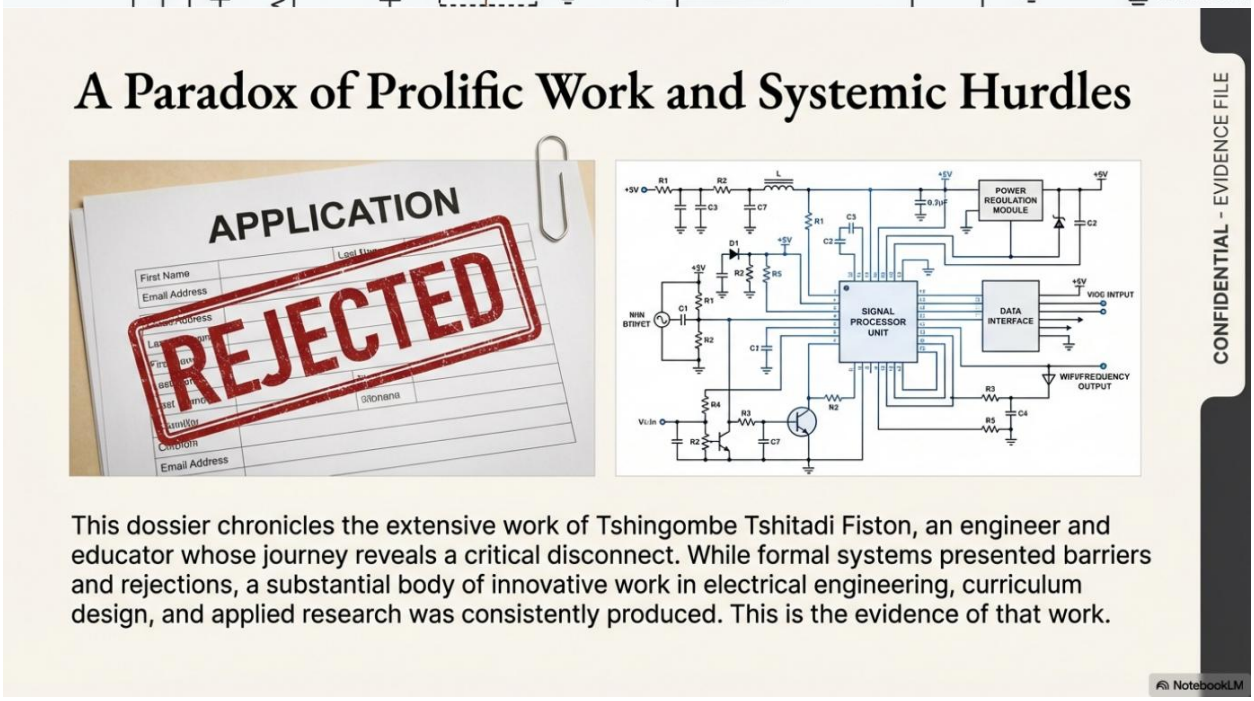

The Labyrinth: Navigating and Reforming South Africa's TVET Landscape
A Practitioner's Case for an Integrated Electrical Engineering Qualification Framework
When the system is flawed, expertise is forged in navigating its complexities. This is the story of that navigation—and the blueprint for a better way forward.
NotebookLM


A Paradox of Prolific Work and Systemic Hurdles
APPLICATION
First Name
Email Address
REJECTED
POWER REGULATION MODULE
SIGNAL PROCESSOR UNIT
DATA INTERFACE
VIOG INTPUT
WIFI/FREQUENCY OUTPUT
This dossier chronicles the extensive work of Tshingombe Tshitadi Fiston, an engineer and educator whose journey reveals a critical disconnect. While formal systems presented barriers and rejections, a substantial body of innovative work in electrical engineering, curriculum design, and applied research was consistently produced. This is the evidence of that work.
CONFIDENTIAL - EVIDENCE FILE
NotebookLM

Diagnosing a System Marked by Friction and Delay

The Technical and Vocational Education and Training (TVET) system for engineering studies is characterized by systemic irregularities that create significant barriers for learners and lecturers.

Qualification Irregularities

"Nated ncv combination irregularity," non-accredited qualifications, and challenges in recognizing foreign qualifications (SAQA).

Administrative Backlogs

"Slow to challenge factor learning and release resultat printed statement," "marking in progress," and extensive delays in issuing diplomas and certificates from DHET.

Curriculum Misalignment

A gap between theoretical knowledge ("trade theory") and practical, industry-relevant skills required by employers like Eskom and City Power.

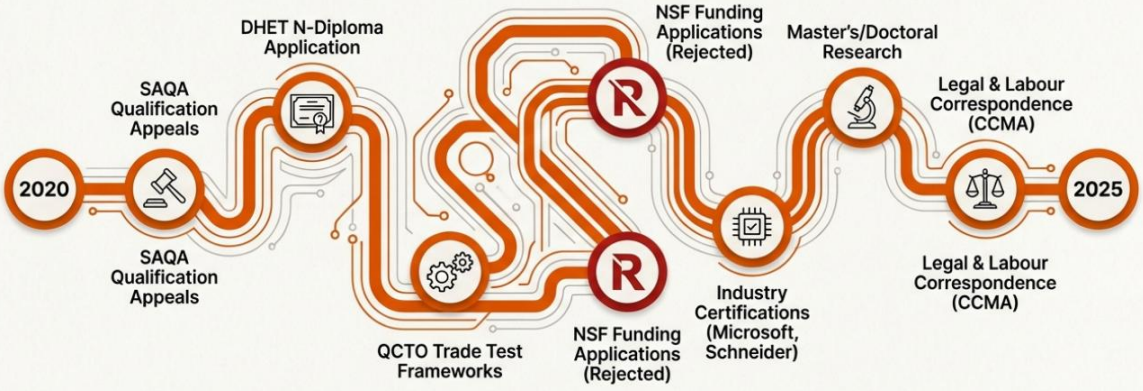
Assessment Inconsistencies

"Non credible process," "irregularite material script," and a lack of standardized, fair assessment policies for Portfolios of Evidence (PoE).

NotebookLM

One Practitioner's Journey Through the Labyrinth

This presentation uses a multi-year case study of navigating the TVET system to diagnose its core challenges and propose a robust, integrated solution. The evidence presented is a direct result of this journey.

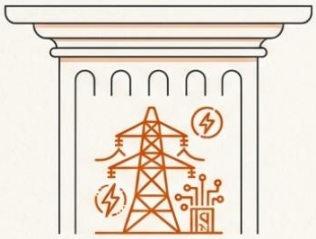


"The author is not just talking about the problem; he is the evidence."

NotebookLM

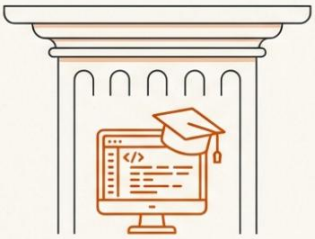
Forging Multidisciplinary Expertise Through Adversity

Navigating the labyrinth of qualifications, funding, and curriculum gaps required the development of a comprehensive skill set far beyond traditional engineering.



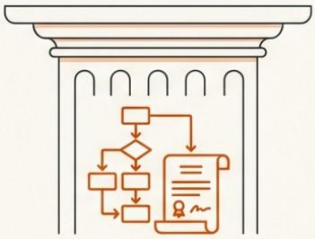
Advanced Engineering & Power Systems

Deepening the core technical domain, with a focus on rural energy, smart grids, and industrial automation.



Digital Systems & Educational Technology

Mastering the digital tools necessary to build modern learning solutions and streamline broken administrative processes.



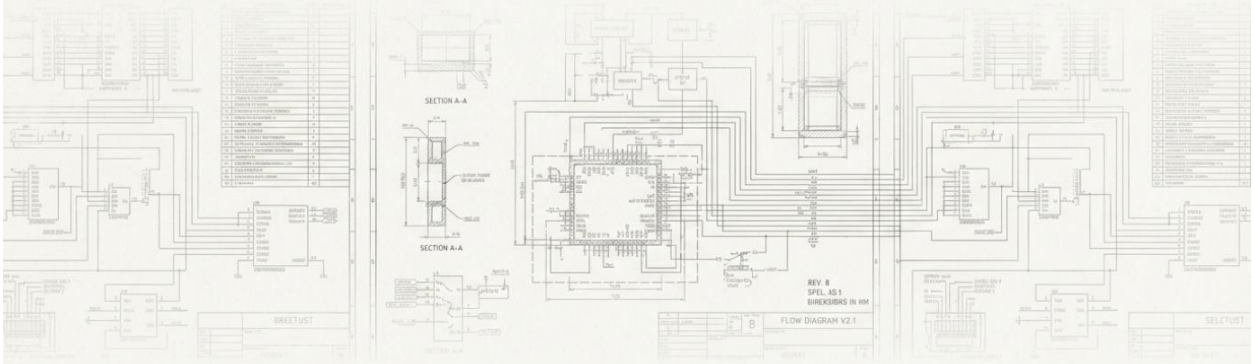
Policy, Pedagogy & Framework Design

Undertaking formal research into the very systems of education, assessment, and qualification that created the initial obstacles.

NotebookLM

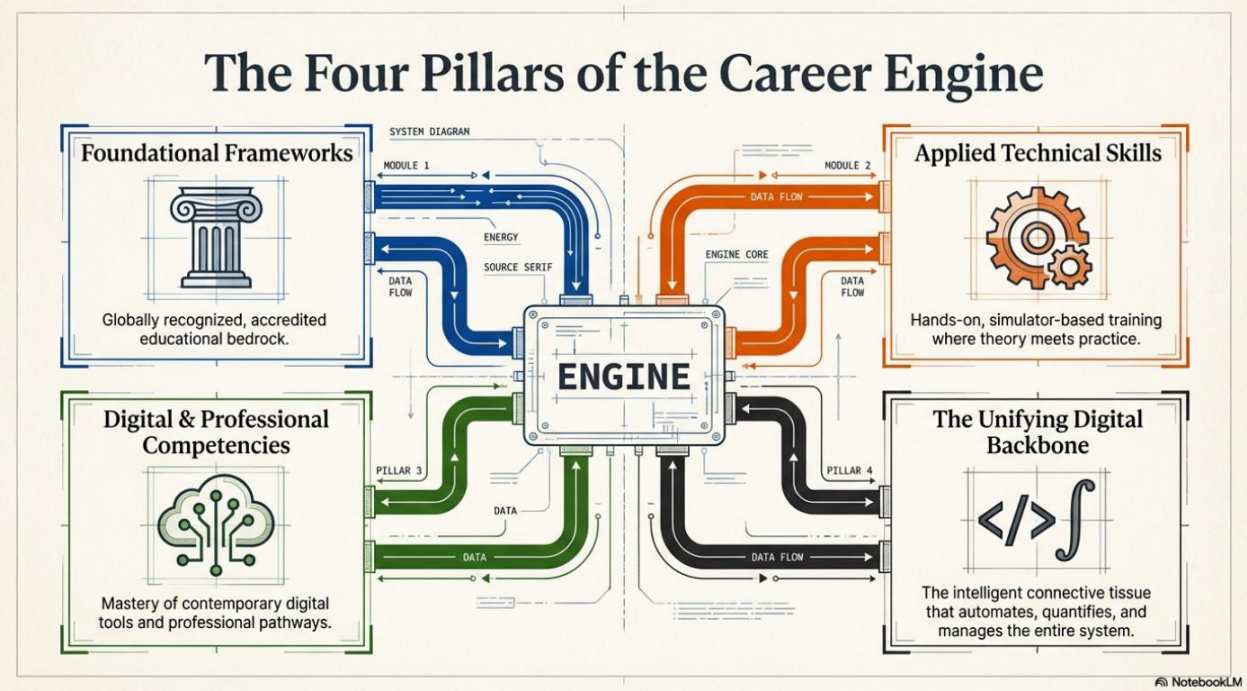
The Audit-Grade Career Engine

A Blueprint for Verifiable Competence



A modular framework that synthesizes formal education, vocational training, and workplace experience into a single, auditable system.

NotebookLM



Building on a Bedrock of Global Academic and Technical Standards

Foundational Frameworks (Pillar 1)

South African Qualifications Authority (SAQA)

Qualification	National Certificate: Electrical Engineering (ID 72071)
Unit Standard ID	259037
Title	Design and install electrical wire ways
Level	NQF Level 3
Credits	8

French Higher Education

BTS Électrotechnique - Compétency Block

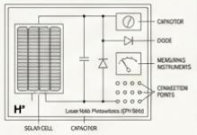
RNCP41007BC01 (in Source Code Pro)

Étude et conception préliminaire d'une installation
(Preliminary study and design of an installation)

Applied Technical Skills (Pillar 2)

German Didactic Systems (Lucas-Nülle)

Leveraging the UniTrain and InsTrain modular learning systems for hands-on experimentation in electronics, automation, and renewable energy. The system includes guided fault simulation and real-time diagnostics.

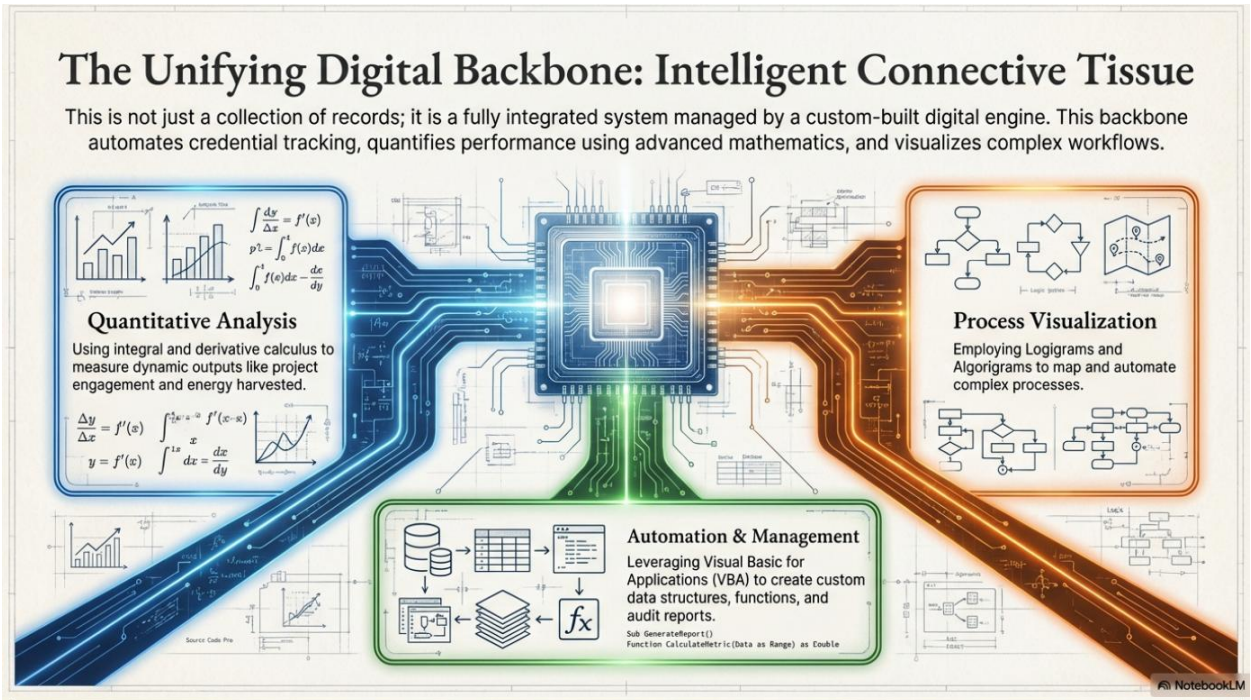


Indian Vocational Training (ITI)

Incorporating the National Instructional Media Institute (NIMI) curriculum for Electrician Trade (NSQF Level 5), which emphasizes structured practical exercises in wiring, soldering, and workshop safety.

NIMI Curriculum: Electrician (NSQF Level 5)	
Module No.:	3
Module Title:	Wires, Joints - Soldering - U.G. Cables
Allocated Time:	125 Hrs

NotebookLM


The Unifying Digital Backbone: Intelligent Connective Tissue
This is not just a collection of records; it is a fully integrated system managed by a custom-built digital engine. This backbone automates credential tracking, quantifies performance using advanced mathematics, and visualizes complex workflows.
Quantitative Analysis
Using integral and derivative calculus to measure dynamic outputs like project engagement and energy harvested.
Process Visualization
Employing Logigrams and Algorigrams to map and automate complex processes.
Automation & Management
Leveraging Visual Basic for Applications (VBA) to create custom data structures, functions, and audit reports.
Sub GenerateReport()
Function CalculateMetric(Data as Range) as Double
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The Engine's Logic: Quantifying Performance with Code and Calculus

Credential & Calculation Tracking

```
' Module: CredentialDashboard
Type CalculationRecord
    DateStamp As Date
    Topic As String
    MethodUsed As String
    SimulationTool As String
    ResultSummary As String
    Award As String
    RewardPoints As Integer
End Type
```

A Quantitative Approach

Total Engagement Over Time:

$$E_{\text{total}} = \int_0^T E(t)\,dt$$

Total Energy Harvested (Wind):

$$E = \int_0^T \frac{1}{2}\rho A v^3 \eta dt$$

Rate of Task Completion: $\frac{dN}{dt}$

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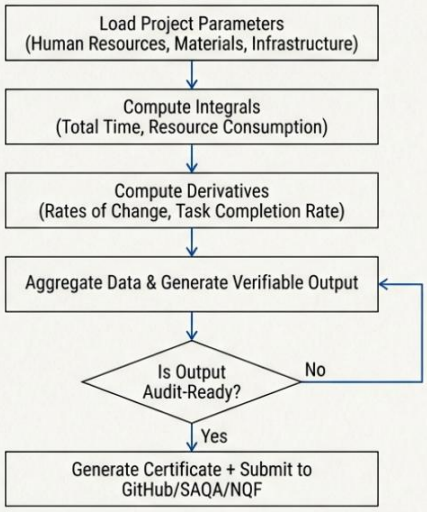
Visualizing the Workflow: An Automated, End-to-End Process



This automated workflow ensures every credential is the product of a traceable, data-driven, and verifiable process.

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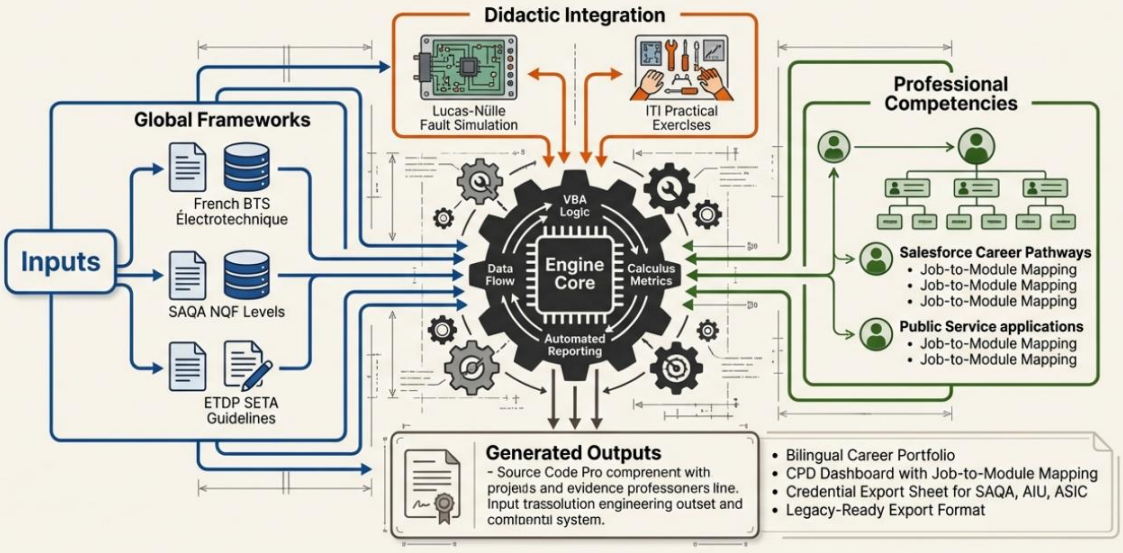
The Complete Blueprint: A Synthesized Career Dashboard



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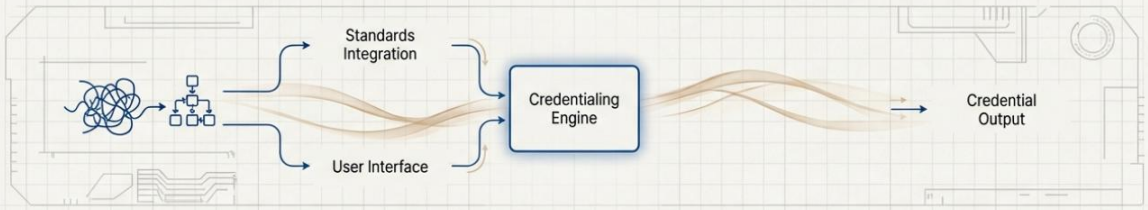
The Result: A Dynamic, Verifiable, and Audit-Grade Professional Identity



Systematic Architecture

Turns the chaos of modern credentialing into an ordered, logical, and automated system.

Audit-Grade Traceability

Every skill, competency, and credential is backed by a verifiable data record.

Cross-Domain Mastery

Proven ability to quantify and validate expertise in engineering, law, education, and technology.

Future-Ready

An engine built for a world of continuous learning, micro-credentialing, and dynamic career paths.

This is the definitive engine for building and managing a modern professional identity—one that is intelligent, integrated, and irrefutable.

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The Blueprint: An Integrated Framework for TVET Engineering Studies

Vision: To create a responsive, technology-enabled TVET ecosystem that seamlessly integrates curriculum, practical experience, and industry needs to produce verifiably competent and employable engineering professionals.

Key Principles

- ✓ **Outcome-Oriented:** Success is measured by real-world competency, not just theoretical exams.
- ✓ **Industry-Validated:** Curriculum and assessments are co-designed and constantly validated by industry partners.
- ✓ **Digitally Integrated:** Leveraging technology (LMS, e-Portfolios, AI) to ensure efficiency, transparency, and data-driven improvement.
- ✓ **Holistic Development:** Combining technical skills with soft skills (communication, problem-solving) and professional ethics.

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The Case for a New Model of Expertise

- The evidence demonstrates a sustained, high-level output of technical and pedagogical work against significant systemic friction.
- This journey has forged a unique, multi-disciplinary expertise that integrates core engineering, curriculum design, and a deep understanding of global qualification systems.
- The challenge is no longer one of validation, but of recognition and engagement. The work stands on its own merit.

Engage the expertise. Recognize the innovation.

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